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ABSTRACT

This document is the second in a series designed to describe agricultural education projects and practices which have been successful in promoting agricultural change and improvement in areas of the world where subsistance agriculture predominates. The projects are included here because of their emphasis on development of human resources and potential use in world settings. The 16 projects described relate to specific agricultural education concerns, such as instructional media, development of areas of production agriculture, educational levels and educational agencies. The production agriculture topics include training courses for fishery staff, horticulturists and forestry. The uses of radio broadcasting and textbooks projects are described. Plans are included on the World Conference on Agricultural Education and Training in Copenhagen, 1970 and the statutes of the joint advisory committee of the FAO, UNESCO, and ILO. (RR)

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AGRICULTURAL EDUCATION AND TRAINING

ANNUAL REVIEW OF SELECTED DEVELOPMENTS

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
ROME, 1968

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Food and Agriculture Organization of the United Nations, Rome, 1968.

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FOREWORD

The range of FAO activities has now become so extensive that I have selected five key topics which are of particularly crucial importance and on which we shall concentrate the major part of our efforts and resources in the next few years in order to bring about as rapid and effective an improvement as possible in the world's food and agricultural situation. One of these five specially selected topics is the fuller mobilization of human resources for rural development. If we are to succeed in this, it is clear that a vital factor will be agricultural education and training.

In the past, there has been a tendency to concentrate research concerned with agricultural improvement mostly upon technical and economic aspects. There has been a failure to appreciate fully the essential part which human enterprise and endeavour have to play in agricultural progress. This human factor is especially important in those vast areas of the developing world where relatively unproductive subsistence agriculture still predominates. Since agriculture is the basic industry of most of the countries concerned and since their future progress is so largely dependent on a rapid and sustained rise in agricultural productivity, the farmer, his family and the rural community are of tremendous significance in the national development effort. They are one of the most important "resources" that can contribute to the agricultural change and improvement so urgently needed.

The development of a modern agricultural economy, no matter on what social or political pattern it is based, calls for new attitudes and aspirations, the acquisition of many new skills and techniques, the inculcation of business ability and management capacity as well as the acceptance of new concepts and ways of life. In this complex process of transition, education and training have a unique contribution to make. They can only do so, however, if they are closely related to the situation and needs of each country. Moreover, they must be systematically adapted to the changing requirements for development. Thus, agricultural education and training, if they are to serve their purpose well, need to be constantly modified and improved. It was partly to stimulate interest in this whole question and to draw attention to noteworthy and successful achievements in this field that the Review of Selected Developments in Agricultural Education and Training was started in 1967.

The year 1968 marks what we believe will be the beginning of a new and important phase of much closer collaboration among the UN specialized agencies most directly concerned with education and training for rural development. An Aide Mémoire setting out the broad basic principles for a fully-integrated cooperative

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programme of work in agricultural education, science and training was signed by the Directors-General of UNESCO, ILO and FAO on 3 May 1968. The text of the agreement is published in this Review. Already, the three Organizations are jointly planning for a World Conference on Agricultural Education and Training to be held in the summer of 1970 at Copenhagen. These are just two examples of the growing collaboration between the three UN specialized agencies concerned with the question.

With this background, it gives me very great pleasure to introduce this second Annual Review. Many of the articles have been contributed by people with long experience in the educational field outside FAO. We are particularly grateful to them for sharing this experience with us, and we look forward to many other contributions of this kind in the future. The problems of agricultural development are so varied and complex that there are no simple answers of universal application, and in these circumstances knowledge of the experience of others may save much time and wasted effort. It is my hope that the exchange of ideas and experience through a publication of this type will contribute to a better understanding of how agricultural education and training can most effectively contribute to agricultural development in many parts of the world.

A.H. Boerma
Director-General

Rome
November 1968

TRAINING COURSE FOR FISHERIES STAFFS IN THE CARIBBEAN REGION

By A.M. ANDERSON

Department of Fisheries, FAO, Rome.

Since August 1965 when the Project became operational, sixteen English, French, Dutch and Spanish-speaking countries in the Caribbean have been participating in a four-year United Nations Development Project executed by FAO. This project aims at developing the fisheries of the region through a programme of exploratory fishing, training and marketing development.

Early in 1968 the project conducted a ten week course for fishery staffs of participating Governments in Barbados, the project headquarters.

The training centre was located at Canefield House, an old Plantation House, leased to the project by a church organization, providing good classroom and residential accommodation, and catering facilities.

Fifteen trainees attended the course which was somewhat unusual in that the participants included senior fishery administrators, intermediate officers and junior officers. Participating Governments were invited to nominate officers they thought would profit from training along the lines of a provisional syllabus circulated to them; they were also invited to comment on the syllabus with a view to supplementing it or revising it to meet the needs of their trainees.

The final syllabus showed little change from the provisional one. It was extremely comprehensive, covering many aspects of fisheries work and included approximately three hundred periods of formal instruction supplemented by evening lectures and films. The course Director participated in all lectures and nine of the project staff, as well as outside personnel, contributed lectures or gave practical training in their specialized fields.

It had been anticipated that the varied background of the trainees would necessitate some form of tutorial training to allow the junior officers to keep abreast of their senior and more experienced colleagues. In the event this did not prove necessary for the junior officers were extremely able and worked hard to keep pace with their senior colleagues. Throughout the course the trainees worked well, and a measure of their enthusiasm was the fact that they often worked until the early hours of the morning in study and revision. They were fortunate in having available a library of over four hundred fisheries books and other publications kindly loaned by the British Council, a facility of which they made good use.

The syllabus covered the following broad subject matter:

Introductory	The world food situation; the Caribbean food situation; the role of fisheries.
The Resources	Basic oceanography; fisheries research; the nature and classification of resources; fish and fisheries of the Caribbean - elementary fisheries biology.

Exploitation	Exploratory and experimental fishing; the detection and location of fish stocks; fishing craft, fishing gear and equipment, fishing methods.
Handling, Marketing and Distribution	The care and handling of fish at sea and on shore; the use of ice; primary, wholesale, and retail markets; co-operative societies; consumer education; nutrition campaigns.
Processing	Freezing, salting, smoking, drying and canning of fish; the manufacture of fish meal; the manufacture of by-products; the economic aspects and costing of processing operations.
Fisheries Administration	The role of government; the functions of a fishery department; planning and policy making; fisheries regulations; the selection and recruitment of staff; man management, budgeting.
Fisheries Development Work	The use and application of fisheries statistics; the planning and conduct of fisheries surveys; extension work.
Navigation	
Experimental and Exploratory fishing on M.V. Fregata	

The content of this training programme might be open to challenge on a number of counts - the syllabus is too comprehensive, it does not permit any subject to be covered in depth and it places too much emphasis on shore-based training. However, it was adopted for the following reasons:

(i) A study of the background of the trainees indicated that very few had received any formal training in fisheries work. Some had "wandered" into fisheries after employment in other fields outside government; some had voluntarily transferred from other sectors of government and others had probably been "steered" into fisheries. Some of the trainees were newcomers with little knowledge of fisheries work but were obviously keen to learn, whereas others with more experience were showing signs of frustration at the lack of career opportunities, and were at a point of decision as to whether to continue or leave. Amongst this latter group were officers of undoubted ability, the departure of whom would have been a serious loss to their departments.

In an attempt to remedy this situation every effort was made to instil in the trainees a pride of profession by attempting to cover a wide spectrum of fisheries activities. This gave them an indication of the many, varied and interesting aspects of fisheries, of the considerable advances which are being made, and of the contribution fisheries can make to improvement in the regional and world food situation. It was hoped that by doing so the interest of the newcomers would be stimulated and that of the waverers rekindled.

(ii) Most fishery departments in the Caribbean - as in other developing countries - carry very small establishments. The duties of the individual officers are many and varied and at one time or another touch on all the subjects listed in the syllabus, as well as on others. Very few departments can afford to carry specialists. Fishery officers must be "all rounders" occupying themselves with every phase of their industry. Whether it is desirable or not, this situation is likely to continue for many years to come, and so long as it does the officers concerned must have a knowledge of a wide range of subjects.

(iii) It is true that a comprehensive syllabus does not permit any subject to be covered in depth, but for these "Jack-of-all-trades" officers this is not really needed, at least, not when their industries are in an early stage of development. So long as they have to occupy themselves with every aspect of their industry, and to operate with limited resources, they require above all else the ability to think constructively and to work purposefully. These qualities, reinforced with a basic understanding of the principles and factors involved in all the activities in which they will inevitably become involved, will equip them to make an intelligent analysis of the situation as it exists in their industry, identify the problems and draw up and execute realistic plans to deal with them.

The training necessary to encourage these qualities took the form of a number of classroom exercises of a business management type during which individual and group solutions to various situations were thoroughly dealt with. Considerable emphasis was also placed on the need to acquire understanding of the various economic factors which can influence the success or failure of particular developments. In addition, to improve the self-confidence of the trainees and to develop their powers of initiative and resourcefulness, they were required to give both prepared and impromptu lectures on fisheries and other topics.

(iv) In emphasizing the above-mentioned aspects of a fishery officer's work, the practical aspects were not overlooked. Approximately half of the periods were allocated to practical instruction. However, only a small proportion of this was actually carried out in the field, including exploratory and experimental fishing on board M.V. Fregata (the smallest of the project vessels), the conduct of field surveys on production and marketing, and elementary fish processing such as salting, drying and smoking. Most of the practical work was, in fact, carried out in the classroom, partly because the project vessels were already heavily committed to other programmes of work but also as a matter of deliberate policy to accommodate the type of training described in (iii) above.

> This policy of deliberately minimizing practical field work perhaps requires some explanation. In a course of extended duration a long period of field training is a necessary follow-on to classroom instruction. However, on short courses, such as the one in the Caribbean, the course Director must decide how the trainees can extract the most benefit in the limited time available. This, in turn, raises the question as to what are those aspects of his work in which the average young fishery officer in a developing country requires the most assistance and guidance? It is suggested that they are those qualities set out earlier. Practical ability in itself, whilst useful, is not a vital qualification for an all round type of officer. From time to time one encounters officers who have achieved a high degree of practical competence in some limited field, but in acquiring it, and in devoting their time to the application of it, they often lose sight of their broader functions and responsibilities and neglect development in other sectors of their industries.

In developing countries it is often difficult to attract officers of the right calibre to the fisheries services and the turnover of young officers is high. This is usually attributed to the lack of promotional outlets and career opportunities in what is usually a very small sector of government. However, whilst these factors undoubtedly play a large part in bringing about this situation, there is possibly another reason which has not been fully taken into account.

To many governments "Fisheries" is still an unfamiliar and unproved sector for development. They require evidence of positive results before considering an expansion of their fisheries services. At first sight this would seem to be a vicious circle, with development being impeded because of lack of resources of manpower, equipment and finance and the reluctance to make these resources available until progress has been made. The remedy must lie with the fishery departments. Despite their limited resources, they have many opportunities to bring about worthwhile developments and achieve the recognition and rewards they desire. Some departments have taken up the challenge and others could follow suit, but before they can do so fishery officers have to develop a new approach to their work.

All too few young fishery officers seem to realize that it is they who should plan the short and long-term programme of work and steer their industries along the lines which will lead to the fulfilment of their plans and policies. Instead, they are often apt to accept the situation as they find it and their working days are fully occupied in dealing with all kinds of events which originate outside their department and over which they have no control. The energy and time devoted to dealing with these contributes little to overall development.

In this kind of situation progress is slow and frustration inevitable. It is thought that it could be countered by giving guidance and training to all levels of staff so that they can experience the satisfaction which comes from bringing well planned work to a successful conclusion. The Caribbean course attempted to do this and there is no doubt that the trainees responded well. By the end of the course they were a more aggressive group with a more positive approach to their work.

NOTES ON INTERMEDIATE-LEVEL AGRICULTURAL EDUCATION AND TRAINING

With special reference to the Middle East

By FELIX J. BRUCHER

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Introduction

Intermediate-level (or technical) agricultural education and training is an important part of 'education in agriculture', which is the term used here to indicate the total of education and training efforts directed towards the formation of needed manpower categories, in quality and quantity, for agricultural development. Education in agriculture is understood to include higher education in agriculture (university level); vocational agricultural education and training; agricultural extension; farm youth club programmes; activities of agricultural chambers, associations or co-operatives that have educational or training character; and "rural education" (if existing as part of general education).

All these field or levels of education in agriculture are closely interrelated and interdependent and anything done for one level or programme will necessarily have its effects on the others. Actions taken for different levels or individual programs must be perfectly co-ordinated and be subject to a strict assessment of their impacts on the advancement of the total field. Thus judgement of the efficiency of such projects should be twofold, namely, how effective are they intrinsically and how well are they supporting or complementing other levels or programmes, considering the need for dynamic progress within the total field of education in agriculture?

Vocational agricultural education is understood here to indicate training programmes of any duration in agriculture, below the university level, foremost for young men (and women) of farming or rural extraction, approximately 15 to 25 years of age, with the main objective of preparing them either for improved farming or for (intermediate-level) technical-practical activities with official agricultural services or in agricultural production. Thus vocational agriculture can be divided into two rather distinct levels or phases, each with differing main objectives.

For the purpose of this paper, practical vocational agricultural training or 'farming training' is understood to generally mean a production-oriented, functional type of training conveying simple basic knowledge for improved local farming, with strong emphasis on practical skills.

Technical (or intermediate-level) agricultural education or training, in turn, would generally indicate the more complex formation of intermediate-level manpower, (foremost, the so-called agricultural technicians), providing the necessary basic and specialized knowledge (plus practical and technical skills) for intermediate-level jobs with agricultural services or more advanced commercial or specialized agricultural production activities. It is this type of training with which we are concerned here.

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* The opinions expressed in this paper are those of the author and do not necessarily reflect the views of the Ford Foundation. The author has many years of experience in the Middle East.

Since, for our purposes we are identifying intermediate-level agricultural training primarily with the training of technicians, an attempt to describe briefly what is meant by 'agricultural technicians' seems appropriate.

First of all they are members of the agricultural middle-level manpower group. As such they can be regarded as the link between university trained agriculturists (so-called agricultural graduates) and the farmers, acting as practical-technical assistants to graduates and leading co-workers, helpers and demonstrators to farmers. Seen in this way, the functions of agricultural technicians can in a way be compared with those of foremen in industry.

Adopting a wider view, one could regard a technician as a person trained to perform (usually in the service of official agricultural institutions) practical, technical, managerial, educational and other pertinent activities for agricultural development that are clearly beyond the skills, knowledge and capacities of most of the farmers in developing countries at any given moment. However, a technician need not necessarily be thought of as a permanent member of the civil service. On the contrary, anybody (trained or naturally gifted and experienced) who can act as a promoter of progress in agriculture on the farming or intermediate technical levels (in an official or private capacity) should be considered as a 'technician' in the widest sense of the word. A technician also need not necessarily have received a secondary education.

Agricultural technicians are called upon to perform a great variety of activities in a multitude of jobs with agricultural services or in private farming. Space does not allow a complete enumeration of these possible middle-level jobs. They include activities in agricultural research, vocational teaching and extension; in major production branches and for individual crops; in special service institutions; in fields related to agriculture, such as forestry, fisheries, processing industries, veterinary establishments and programmes; in irrigation and settlement projects; for production statistics and other surveys; in rural education and community development programmes; in co-operatives and farm machinery stations; in credit, marketing and storage organizations; in range management, water and irrigation control, etc. In each of these sectors, jobs can range from practical-technical field work to advisory and/or supervisory activities, from administrative-technical to technical-operational and educational functions. Thus, even in smaller countries agricultural technicians perform a very wide variety of tasks.

Some special aspects of middle-level manpower and its formation

The great number of different activities a technician is called on to perform indicate clearly the great importance of middle-level manpower in agriculture. This manpower group is in fact the one that must take over in many countries part of the role of landowners, merchants, entrepreneurs, contractors, moneylenders, etc. who have traditionally contributed to the 'management' of production prior to land reforms. Wherever they disappear, replacements with middle-level manpower - along with other measures of course - are indispensable for agricultural development.

Another characteristic of this group is its outstanding operational (and also numerical) importance. It provides support both for farmers as producers and to agricultural graduates as scientists, technologists, managers and administrators. This intermediary role of middle-level manpower is of the greatest significance to the promotion of development.

Unfortunately, in many countries, efforts to turn out this particular category of manpower (in quality and quantity) have not been in keeping with its basic importance. In fact, success in this respect has eluded them and failures are numerous. Some of the main reasons for this are:

- lack of adjustment of the education and training programmes to manpower requirements, both for public and private sectors in agriculture.
- perpetuation of unsuitable education and training systems or programmes, such as a single 10 - 12 grade course for all technical agricultural personnel.
- education and training programmes are often not given proper support in staff, finances, etc. that enables them to occupy a strong position within agricultural development.
- ministries of agriculture often suffer from structural and organizational shortcomings which prevent vocational agriculture from taking its place as equal partner to research and extension. These may impede the constructive employment of sufficient numbers of agricultural technicians of the required qualifications. Civil service conditions for official employment and opportunities in private agriculture are frequently not attractive enough for graduate technicians and, on the other hand, potential employers often do not want the type of technicians available because,it is alleged,they lack proper training.
- where intermediate-level agricultural training is under the Ministry of Education, the following disadvantages are likely to result:
  - (1) courses are inevitably conducted in isolation from other important agricultural projects (notably research and extension which together with vocational training, should form an operational 'trinity' for effective development action).
  - (2) somewhat theoretical and not directly applicable courses, so far as the needs of national agriculture are concerned.
  - (3) lack of adjustment to shifting manpower needs in agriculture.
  - (4) excessive integration with the general education system which - apart from the point made in (2) above - brings about a series of minor, but highly undesirable educational, technical, operational and administrative situations apt to undermine the practical and functional character vocational agriculture programmes must have.
- agricultural research programs are insufficiently developed to provide vocational agriculture with the data necessary for functional training in the service of agricultural development.

- general education in rural areas is often not developed enough to produce sufficient candidates with an adequate educational background to undertake technical agricultural training.

- as regards educational shortcomings, the following are the most prominent:

  (1) Lack of well trained vocational agricultural teachers and instructors. In many cases they do not receive training in good teaching methods, nor do they have up-to-date knowledge of their subject - particularly as regards their own country's agriculture. Moreover, they usually lack practical experience.

  (2) Study plans are too theoretical and often modelled on agricultural college curricula - obviously a totally unsuitable arrangement for intermediate-level training and its specializations. Another shortcoming is the exclusive use of traditional teaching methods (e.g. lecturing) and the lack of good teaching materials or use of bad quality or unsuitable ones.

  (3) Practical facilities of training centres or schools (farms, farming and training equipment, etc.) are in many cases inadequate. Practical work on school farms is often badly organized and not related to the teaching of skills. Partly as an outcome of this its purpose is not understood and appreciated by the trainees.

It has been pointed out above that middle-level manpower in agriculture has to fulfil a great variety of tasks in agricultural production and with many agricultural services and institutions. These tasks cover a wide range of technical levels. Consequently it is indispensable to train different types of technicians, both as regards levels and specializations. To start with, distinction may be made between lower-level and higher-level technicians. Village-level agricultural extensionists and trained field workers such as farm mechanics, etc. would be representatives of the lower-level group, while research assistants, vocational agriculture assistants and, generally, staff for more senior positions and more advanced technical jobs (not necessarily on the production level only) could be regarded as higher-level technicians. No rigid line can be drawn between the two categories, and lower-level technicians should have the possibility to move into higher-level jobs through prolonged experience, good performance and additional training. Normally, higher-level technicians would be working for official agricultural services, while lower-level technicians might also be employed by private agriculture.

In addition to this horizontal division into two main categories, the total technician group can be vertically divided into specializations according to major production or service fields, as mentioned above.

Apart from the male technician group, there is the female group of e.g. home economics technical personnel to be considered. The active participation of rural women is of great importance for agricultural development. To bring this about, the training of female technical staff, particularly on the intermediate-level, is indispensable.

The foregoing remarks about the need for many types of technicians make it clear that education and training programs designed to form this very heterogeneous middle-level group must be of high standard as regards quality, diversity, flexibility, scope and functional value. To find the right formulas for the training of such personnel is indeed one of the major elements of the art of agricultural development.

Following the above general remarks, a few specific aspects of intermediate-level agricultural education and training are discussed below and suggestions included that might be helpful in organizing, operating and improving pertinent programs, particularly in Middle Eastern countries where the author has had his main experience.

Planning

To insist on the need for careful and effective planning on the national level might be considered as being superfluous at the close of the second decade of organized economic development. By now everybody concerned with development anywhere fully accepts the need for planning in all sectors, including agricultural, educational and manpower planning with which we are mainly concerned here. Still, many countries in the area have to go a long way from this basic acceptance to full and effective planning action and proper implementation of development plans. The existence of planning bodies is not quite enough. Good planning stands or falls by the professional capacities of planning staff on all levels and the full participation of as many as possible of those directly affected by planned development.

Due to its fundamental importance for agricultural and national development, technical agricultural education and training must receive full attention on the national planning level in order to ensure its proper position and needed financial and other support.

The two agencies most closely concerned with planning are the ministries of agriculture and education. Neither can, nor should, do this planning alone, regardless of which actually operates the programme. Both ministries should therefore plan vocational agriculture together as an inter-agency exercise.

The bulk of work will for a variety of reasons fall on the ministry of agriculture. The purely 'educational' aspects of planning for intermediate-level agricultural training are relatively few, and can normally be well taken care of by ministries of education and considered by a joint inter-agency planning group of the two ministries.

Apart from basic pre-requisites for all planning exercises - formulation of objectives, collection of factual data, etc. - the following points should receive special attention:

- fully co-ordinated and integrated planning for agricultural research, extension and vocational training as an operational 'trinity' of basic long-range importance for agricultural development.

- closest possible adjustment of education and training programs in type, scope, level and quality to middle-level manpower needs for national agriculture and its development.

- careful determination of the most desirable ratios of middle-level to university trained agriculturist groups as well as their relation to the numbers of trained and untrained farmers.

- taking into account the need for regional approaches for agricultural development (within a country) and its necessarily important implications for middle-level manpower needs.

- regarding the human factors and their potentialities as a co-determinator of major objectives and strategy for agricultural development, alongside physical and financial resources. The planning of education and training should not form a 'passive' part only of total agricultural planning by being merely 'filled-in' once production targets and other physical objectives are set. On the contrary, assessment of the strength of the human factor and the designing of education and training programmes to bring out fully its potentiality is one of the essential aspects of total agricultural development planning.

Educational background and length of technical training

The amount and quality of general education obtained prior to technical training is obviously of great importance. However, there are limits to the assumption that the more of it there is the better, particularly so far as the training of lower-level technicians is concerned. Here, and in varying degrees for all technicians, the phenomenon of "teaching away from agriculture" (or more specifically "the teaching away from technical field jobs") must be very carefully watched. This 'teaching away' is of course caused by both the length of education prior to training and the length of training itself. Also, a number of other factors, such as certificates or diplomas gained, educational cycles designed to provide continued education, job opportunities in sectors other than agriculture, etc., are causing the 'loss' of trained technicians from agriculture.

The main issue here is to strike the right balance between education and training requirements for effective middle-level manpower for national agricultural development on one side, and the checks imposed on length, sophistication and general level of training by socio-economic and other circumstances to which trainees and the country's agriculture are subject, on the other side. Also, one should not underrate the situation, so often found, where salaries and general working conditions for agricultural technicians do not correspond to the level and length of training received. The trainees, as a result of this (and for other reasons as well), drift to urban jobs of any kind they can obtain.

For obvious reasons, it is impossible to establish a generally applicable rule regarding the most suitable amount of general education prior to intermediate-level technical agricultural training, and the length of this training itself. However, for most Middle Eastern countries, a 9th grade general education certificate can now be regarded as feasible and desirable. For certain lower-level technicians, a 6th grade certificate might suffice, or even be considered "better" than a 9th grade certificate.

Normally, the main differces in training for different types of technicians - in level and specialization - will be expressed in the length and type of the technical training itself. This training might range, according to circumstances in different countries, from short courses, to a two-year training, and up to a junior college type of course of three to four years. However, a two-year course one year general and one specialized, can be regarded as providing the best answer, for the training of the bulk of technicians (e.g. agricultural extension agents for village level work and many others). This basic course should be supplemented by periods of further training to meet the needs of any particular situation.

A junior college type of training for certain higher-level technicians should only be opted for after an extremely careful analysis of all aspects of the socio-economic background of the trainees, their future status within the civil service, their working conditions and position vis-à-vis the university trained agriculturist group, etc. One may say that very few countries in the Middle East region should as yet go as far as developing junior colleges for the training of agricultural technicians.

The matter of proper selection of candidates deserves close attention. It is true that, throughout the world, careers are largely built on education cycles completed and diplomas and academic grading received. Opportunities are offered to young people according to what they have achieved in this respect. For vocational agricultural training it is imperative that in addition to these more 'formal' qualifications, prospective candidates be selected on the strength of their origin (farming or rural); attachment to the land and physical aptitude for farming; socio-economic situation of the family; land tenure circumstances and chances for getting established in farming; personality, etc. There exists evidence that when these factors are taken into consideration better results in training and subsequent performance on the job are obtained.

Education and training methods

As noted earlier, education and training programmes for agricultural technicians should in general be divided into two distinct parts - general and specialised. The main purpose of the general course should be to give the future technician a good basic knowledge of the scope and variety of his country's agriculture and to provide a proper foundation on which to base the specialized training which follows. Care must be taken to relate the general course as closely as possible to the educational background of the trainees. Likely handicaps in this connection, such as long out-of-school periods before training and differences in the duration and quality of previous education must be taken into account when designing the general course. Other factors to be considered in the organization of the general course are the inclusion of rural subjects in the education received prior to training and the quality of science teaching. The latter point is extremely important for intermediate-level training in agriculture. Wherever possible the teaching of chemistry and physics, for example, as autonomous theoretical courses - as is normal at secondary schools - should be avoided. The ideal curriculum for the general part of this training is an interdisciplinary one, where sciences and other basic subjects are taught in a strongly applied form, as parts of major comprehensive courses on agriculture and its related studies.

For the specialized part of training, the main objective should be to impart the knowledge and skills required for specific jobs in the various branches of agricultural production and services under official or private auspices.

The programme should be based on teaching units as standard elements which can be grouped together into subject-matter or major areas. If need be, they should be free from a pre-set sequence or fixed time-table. Where demonstrations or skill exercises are associated with a teaching unit, they should obviously form an integrated part of the unit. Major skill exercises, or practical demonstrations may however, if necessary, constitute independent units. Flexibility in conducting specialized training allows for the timing of training according to seasons; to crop cycles; to basic operations regarding soil preparation and conservation, animal husbandry, horticulture, processing and storing of agricultural produce, etc.

As regards both the general and specialized parts of technical training the following additional points are important:

- The training of technicians is never 'completed'. For all types of technicians, the basic standard training must be supplemented, periodically, by refresher courses. Additional training is also required for those deserving advancement into more senior jobs of broader responsibility, or on higher technical levels.

- The full availability and proper use of up-to-date teaching, demonstration, training and practical work materials is of great importance for agricultural technicians who, due to their rural origin, normally respond well to visual aids, have a keen sense of observation and an interest in practical demonstrations, etc. The materials in use must conform closely to the requirements of course programmes in force and must be kept up-to-date and adjusted to any changes which occur in the curricula.

- As in all vocational education or training, teaching methods can have a direct bearing on the success of training. In technical agricultural training, lecturing must be reduced to an absolute minimum and the application of the programmes fully supported by modern teaching methods. The latter however should be in keeping with the capabilities of the trainees to respond positively to such methods.

Administration and operational aspects

Vocational agriculture 'sits astride' agriculture and education, represented by the two ministries concerned. In most countries placing vocational agriculture under one or the other has come about by "accident" rather than design, by tradition rather than through rational analysis of the technical and operational considerations. In other words, where agricultural education and training has "always been" with the ministry of education, it will in most cases continue to stay there, even if valuable arguments are advanced for having it passed over to the ministry of agriculture. The same will hold true the other way round. As in so many development contexts, "resistance to change", questions of prestige and inter-agency jealousies often prevent the acceptance of new, more valid approaches and solutions.

Of course, each country has more or less different sets of circumstances as regards government structure; general education and educational administration trends; structure, organization and "strength" of ministries of education and agriculture, etc. which have influenced, and will continue to influence, where the responsibility for vocational agricultural training programmes should lie. Evidently no general rule can be established as to which of the three possible solutions are the "best" in any particular country, i.e. under the ministry of education or the ministry of agriculture or thirdly, a "compromise" solution where part of the programme is operated by the ministry of education and part by the ministry of agriculture.

The following reflections may help to find a workable solution, particularly where changes are contemplated, new concepts introduced or where development programmes in the field of agriculture or education are being started, adjusted or expanded. In presenting a view regarding the placing of responsibility for vocational agriculture, we base ourselves on several positions, namely:

- that vocational agriculture is an inseparable part of agricultural development designed primarily to prepare manpower for farming and middle-level technical occupations in agriculture.

- that in order to carry out the above effectively this training must (among other things) be essentially a terminal one, be given at the most suitable age for vocational training, and,on the technical level, be designed to bring the trainees to a high degree of 'job-readiness'.

- that the contents and scope of this training, its organization and operation, must be such as to cater closely for the immediate and future needs of a country's developing agriculture and to ensure the flexibility needed for the promotion of technological and social progress in agriculture.

- that there is an undisputed need for a free and rapid flow of experimental data into vocational training in order to ensure its quality and effectiveness, and that it is of considerable advantage to have close ties with the agricultural extension service for a variety of technical-operational reasons.

- that agricultural training, particularly on the technical level, must be a continuous one where a well organized system of refresher, summer and other courses should complement the basic education and training programmes.

- that one decisive factor leading to the success of training programmes is to place training centres on agricultural experiment, research or demonstration stations.

Those accepting the above propositions will realise that the best 'home' for vocational agriculture is the one in charge of agricultural development, namely the ministry of agriculture. This agency that can best safeguard the necessary close working relationship between research, extension and vocational agriculture, and is also in an ideal position to make timely adjustments in training programmes so as to keep them in a 'leading' position rather than have them merely 'follow' what has taken place in agricultural development.

It is true that pedagogical and educational administrative expertise is available at ministries of education in the first place. This know-how must be drawn upon by the ministry of agriculture for its vocational education and training programmes and close co-operation maintained between the two ministries. Whatever arrangement is made for the placement of vocational agriculture, a very close co-operation between the ministries of education and agriculture should be maintained and close contacts established with other institutions concerned. In many cases, a Council for Vocational Agriculture, composed of members from all interested agencies, can contribute considerably to the development of this vital field. Stronger involvement of the ministry of education might be desirable for example for the basic general part of training of higher-level technicians, as such programmes necessarily carry increased numbers of theoretical courses which are more of an 'educational' than a 'training' character.

Well measured decentralization and suitable freedom of action for schools, centres and courses, particularly in countries with very different types of agricultural regions, are essential for the success of technical education and training in agriculture.

PLANNING HIGHER EDUCATION PROGRAMMES FOR WOMEN IN AGRICULTURE AND HOME ECONOMICS IN AFRICA

By LEONARDA M. JURADO

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In recent years a number of seminars and training courses have called attention to the role of women in agricultural productivity in developing countries. It follows that where conditions call for the active participation of women in agricultural production they need adequate training for these tasks, as well as for their responsibilities for homemaking and child rearing. Programmes designed to promote improved techniques in agricultural practices and greater productivity must recognise the need to train women as well as men.

The complex process of change accompanying progress in agriculture requires a balanced approach to the economic and social aspects of development, not only of the farm, but also the home, the family and the rural community. The role of African women in promoting the well-being of the family is often interwoven with the part they play in agricultural production, trading, processing and marketing. This is increasingly recognized.

Training in home economics at different levels, adapted to local conditions and including the appropriate aspects of agriculture, has therefore come to occupy a new and significant place in the rural development plans of many countries.

Potentialities for the Development of Home Economics in Higher Education in East Africa

Education for women in institutions of higher learning is still in the early stages of development in most African countries. However, it is now possible for more women to have access to education at all levels, including that offered in institutions of higher learning.

Freer access to education is not the only encouraging sign. The objectives of the educational programmes now open to women are under critical review in a number of countries. Do these programmes help women meet the rapidly changing social and economic conditions of 20th-century Africa? Do they anticipate the needs of the future? Are they sensitively and realistically oriented to African cultures (and sub-cultures) and not merely an adaptation of what has been found elsewhere? Do they help women appreciate the contribution they can make to the economic, social and cultural development of the country and learn practical ways of doing so?

Such questions present universities and other institutions of higher learning with the special challenge of finding ways to associate themselves more closely with the societies and communities they serve.

Many African countries are responding to this challenge by giving high priority to training in agriculture and associated subjects as a pre-requisite for major development schemes. Such national undertakings as land resettlement schemes, youth training and employment programmes, functional literacy community development programmes, local government and basic democracies, health and social services which promote agricultural progress and development can also be used to promote home and family development. Better home and family living is a fundamental need in most countries of Africa. Every existing opportunity needs to be taken to improve levels of nutrition, housing and child care and to help families make the best use of all their available resources.

Current Programmes in Home Economics in Universities of Africa

The following are some institutions of higher learning in the English-speaking countries of East and West Africa that have developed home economics programmes in the universities. This list deals almost exclusively with home economics in agricultural universities and therefore is oriented to rural conditions:

Nigeria	Faculty of Agriculture, Department of Home Economics, University of Nigeria, Nsukka* Bachelor of Science Degree (four years) Diploma Programme (three years)
Sierra Leone	Faculty of Agriculture, Department of Home Economics, University of Sierra Leone, Njala Bachelor of Science Degree (four years)
Ghana	Faculty of Agriculture, Department of Home Economics, University of Ghana, Legon Bachelor of Science Degree (four years)

Home economics programmes have developed under two different patterns of education, the American and the British. African universities which have adopted the American pattern of education have home economics programmes closely associated with the Extension Education Departments in the Faculty of Agriculture. Countries which have followed the British educational pattern have their own orientation for home economics programmes.

Some faculties of agriculture are offering professional home economics training in both degree and diploma courses. Justification for the existence of these two types of courses offered in the same university is not very clear, especially as the two curricula are not very different. It seems essential that this situation be further reviewed in relation to the country's specific needs for trained manpower to serve the various government and private agencies.

Development of university-level home economics courses can only be justified if they achieve the same academic standards as other disciplines. In view of the urgent need for qualified home economists to staff the universities it is essential that priority attention should be given to this. Expatriates have been employed to develop programmes in their initial stages. However, efforts should be made to provide organized and systematic training of African personnel, so that the leadership essential for developing future programmes is assured.

It is encouraging to note that university programmes in home economics in Africa are recognizing the importance of research as a necessary corollary to adequate teaching. Many research projects of a socio-economic nature undertaken by other departments have been considered relevant to home economics courses because they provide an insight into the problems and conditions of contemporary living. Further studies and surveys that yield relevant information on the part played by rural women in the economic and social life of the community should be undertaken in order to enrich the content of home economics curricula.

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* The course here has been temporarily discontinued.

Up to the present, it must be admitted that student enrolment for home economics courses has been disappointing. Many factors are believed to be responsible, such as lack of understanding of the field encompassed by "home economics", lack of prestige of home economics as a field of study, the tendency of students to select well established professional fields, the limited financial resources of potential students and rigid entrance requirements.

Field experience should be an important part of the training of all home economics students; it is essential for those training for extension and similar services. It is only through a first-hand and thorough knowledge of the communities to be served that the student gains the necessary understanding of the needs of families. Unfortunately up to the present home economics training programmes in Africa have not adequately met this need.

Purpose and Scope in Home Economics

Home economics synthesizes knowledge from the sciences, technology and the arts for the solution of problems dealing with all aspects of home and family living. It is particularly concerned with:

- the provision and consumption of food, clothing, housing and other goods essential to meet the physical, social and psychological needs of individual members of the family

- the performance of household tasks in such a way that they contribute effectively to the attainment of desirable levels of living and furthering individual family goals

- the effective selection and utilization of personal, family and community resources

- the adequate provision for the care and optimum development of the child in the family

- the creation of a home and family environment conducive to wholesome and satisfying personal relationships within the home.

Training Objectives

To bring about rapid growth and advancement in the economy and lives of the population, effective agricultural and home economics extension services are essential. The type of training which combines home economics education with certain aspects of agriculture relevant to women's activities can be properly developed in the faculty of agriculture, resulting in:

- the training of staff qualified to give guidance, direction and supervision to the home economics aspects of broad programmes of social and economic development

- the training of home economics personnel to staff the agricultural and teacher training colleges, secondary schools, national training centres and extension and other rural development services

- the training of research workers in home economics

Basic Considerations for Planning a Training Programme in Home Economics and Agriculture

Education and training in home economics deals with the inter-relationships of the various aspects of family living within the total pattern of daily activities carried on in the home and on the farm. As working partners of their farmer husbands, the women's role in food production, processing and marketing, in addition to their functions as homemakers, involves a tremendous task of coordination of various skills and resources. Their training for these comprehensive responsibilities necessitates a multi-disciplinary approach.

The programme should to some extent provide opportunities for a basic training, common to both the men and women who will be working together in agricultural areas. Where home economics extension services are to be developed alongside - or integrated into - the agricultural extension service, this type of combined programme will lead to a mutual understanding of the objectives of both agriculture and home economics and foster greater appreciation of their special spheres of responsibility. Incidentally, it is believed that trained women extension workers can have a greater influence on the rate of change than men.

Women's functions and responsibilities should keep pace and be integrated into every developing stage. As farming moves into a money economy, other essential skills are needed by women. Training in the wise use and management of resources of money, increased knowledge of consumer education and an awareness of the responsibilities for decision-making - shared between men and women - are challenges to home economics education in an advancing economy.

There should be provision for students to gain first-hand knowledge and experience of farming conditions and practices. Faculties of Agriculture with university farms attached can provide the demonstration of improved homes and farms as an objective to be attained. This will help to teach the women's role in:

(1) the effective utilization of the farm produce at various stages; production, storage, processing, preparation

(2) poultry raising, dairy keeping, care of small animals, bee-keeping

(3) achieving desirable balance of responsibilities between men and women

(4) utilization and management of resources (time, money, skills) available to a family.

Present and Future Needs of Women Trained for Rural Extension Programmes

Accurate estimates of long-term requirements for trained female staff in various rural development schemes are often difficult due to lack of basic statistical data.

Staffing requirements for the agricultural and home economics services have been estimated in relation to the total farming population. It is considered by FAO that for agricultural extension work in most countries a general objective of one full-time (intermediate-level) extension worker per 1,000 families is practicable. It is one which will give reasonable coverage and eventually be within most countries' resources. The senior supervisory and specialist staff required is estimated at one university graduate (or the equivalent) for every 5 intermediate-level personnel.

The number of home economics extension workers employed at present is much smaller than in agricultural extension, and national training facilities are also limited. Where home economics is part of an agricultural extension service, a similar staffing pattern for each service should be the ultimate aim.

In an estimate of home economics extension workers needed for rural schemes in developing countries, FAO, in the Indicative World Plan for Agricultural Development, has proposed the ratio of one home economics extension worker (intermediate-level) per 5,000 families over the short-term (by 1975); and a long-term ratio of one per 2,500 (by 1985). Staff requirements at the supervisory and specialist level are estimated at one for every 15 intermediate-level home economics personnel.

Apart from their employment in the official services, professionally trained women in home economics and agriculture can render useful service in community development programmes, health and education programmes, and in commercial undertakings.

Suggest Curriculum Pattern for University B.S. Degree Programme (Agriculture/Home Economics)

The curriculum featured on the adjoining page reflects the main points discussed here.

The scope of this programme will depend on the extent to which it can effectively utilize the related disciplines already well developed within any institution. It should take into account the existing staff in various disciplines and the facilities for instruction which can be shared with other Departments of the university.

Establishment of this type of curriculum seeks to provide for:

- an integrated approach (Agriculture and Home Economics) to the basic problems of rural family living
- the inclusion of selected social science and education courses appropriate to the profession
- the importance of research and studies of socio-economic nature as a corollary to proper development of the curriculum
- the provision of a flexible approach to the development of the curriculum, which will take into consideration the essential requirements for acquiring the professional competence for the job
- a possible re-orientation of the agricultural courses which will provide a functional and realistic approach to the fullest development of the capacities of women and their opportunities for rendering greater service to rural families.

SUGGESTED CURRICULUM PATTERN FOR TRAINING (B.S. DEGREE) IN:

		Home Ec./Agric.		Agric./Home Ec.	
		4 years	3 years	4 years	3 years
		%	%	%	%
I.	General Education				
	Sciences:	25	30	25	30
	Physical Biological Social				
	Humanities	5	-	5	-
	English	4	-	4	-
	Introductory Courses	3	3	3	3
	Introduction to Agriculture/Home Economics Introduction to Human Nutrition				
II.	Professional Education	15	15	15	15
	Rural Sociology/Psychology Extension Methods/Education Field Experience: Home and Farm Development Extension/Education				
III.	Professional Specialization Requirements				
	A. Home Economics Courses	30	33	22	25
	Food and Nutrition Clothing and Textiles Housing Home Management and Family Economics Child Development Family Life Education Special Problem or Study				
	B. Agriculture Courses	18	19	26	27
	Principles of Agric. Economy Soil Sciences Crop Production Animal Production Special Problem or Study				

AGRICULTURAL EDUCATION AT THE INTERMEDIATE LEVEL IN TUNISIA

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While national education serves the whole nation, agricultural education concerns only those who wish to work in agriculture as their chosen occupation - a sector where resources are limited both qualitatively and quantitatively.

The training of more manpower than is necessary involves a risk of spending funds to educate people, certain of whom will be obliged to go into an occupation for which they have not been trained, with the consequent waste of state funds and loss of their time. The opposite situation is even worse, since a lack of trained manpower makes it necessary to recruit people from abroad with a consequent drain of foreign exchange and unemployment of nationals lacking the necessary skills. It is, therefore, imperative that the agricultural education authorities know the country's real needs.

It should be kept in mind that the educator considers the future far more than the present. For example, a student entering school in October 1967 will not become really productive in the agricultural field until six years later in October 1973. Counting on an average economically active life of thirty years, this person will work for his country between 1973 and 2003. Thus it is necessary to know our long-term needs for a period covering at least one generation, allowing for persons who may abandon or change their occupation, deaths, accidents, illness, etc. Forecasts once established are not immutable but should be revised according to the outlook for economic and social development.

As a working hypothesis, let us suppose that through the intensive effort the Government is making in the agricultural field, all Tunisia's farmers can change over from traditional to modern agriculture in ten years. This means that in ten years our needs for agricultural technicians will be greater than at present. A correlation exists between the technical development of the agricultural sector and trained manpower needs. This correlation - expressed as a continually growing function - means that as the number of persons trained in agriculture tends to increase, our national agricultural product also grows, and vice versa. To be concrete, let us take the case of an irrigated district 30,000 ha. in size. Assuming that, before irrigation, rotation of grain crops was practised on this area and 60 technicians were enough to staff the farm. Once the 30,000 ha. are put into a condition to be irrigated, the problem of staffing becomes entirely different. The area will require 20 times more technicians, or one technician for 25 instead of one for 500 ha. as was planned for the original cropping.

This emphasises that agricultural education is not an isolated activity, but rather an integral part of our agricultural economy developing with our economic and social development goals.

Let us now examine Tunisia's agricultural schools and entire educational system. It may be useful first of all to give the historical background of Tunisia's schools of agriculture. The oldest of these, the colonial Ecole supérieure d'agriculture de Tunis (Advanced School of Agriculture of Tunis), was created on 17 October 1898.

It was designed to train colonists' sons with a view to installing them in the colonies. On the eve of independence, more than 2,000 graduates in agriculture (holding degree of 'ingénieurs') of 26 nationalities had been trained at this school, where Tunisians used to be accepted at the rate of one or two a year. To train intermediate level technicians, the farm school called l'Ecole Sidi Naceur was established on 19 May 1914 at Smindja. That establishment accepted only Tunisians, and before independence had trained over 800 farming instructors. Two other schools were created just before Tunisia became independent: Bou-Cherik (Bouchrik) and Sidi-Thabet, with curricula based on that of the Smindja school.

It was not until Tunis had become independent that agricultural education was structured by Law No. 59-97 of 20 August 1959 which provides for three levels:

1. Lower level (premier degré)

Its purpose is to give young men and girls in rural areas who have completed the primary public education program a practical vocational training at agricultural schools, seasonal schools and in rural home economics training centres.

2. Intermediate level

This instruction is given in the Collèges secondaires professionnels agricoles - C.S.P.A. (secondary agricultural vocational schools) and in the Collèges secondaires d'agriculture - C.S.A. (secondary schools of agriculture). It is intended to impart to young people who plan to take up agricultural occupations some theoretical knowledge of agriculture and practical vocational training enabling them to become:

(a) qualified farmers capable of sound management of farm enterprises, that is, farm managers and directors of farmers' co-operatives

(b) middle échelon staff for the technical services of the Ministry of Agriculture in plant production, animal production, agricultural engineering, education and research, etc.

(c) middle échelon staff for private institutions and government, semi-governmental or private agricultural agencies - agricultural credit, marketing, processing of agricultural products, agricultural machinery and fertilizers

3. Higher level

Higher education in agriculture is offered at the Ecole nationale supérieure d'agriculture de Tunis (National Higher School of Agriculture) set up in 1959.

Graduates of this school are called 'Ingénieurs d'exécution' (farm foremen) and 'Ingénieurs de conception' (professional staff) and work in all agricultural fields. The first school has a 4-year curriculum and the second a 6-year course (two in addition to the first course).

This law has made it possible for Tunisia's agricultural education to develop and meet the country's trained manpower requirements for its economic and social development. Today the situation of agricultural education at the intermediate level is as follows:

There are 16 secondary agricultural vocational schools, one of them for girls
4 secondary schools of agriculture
1 school of agricultural engineering and farm mechanisation

1 national school for women instructors
1 school for training technical agricultural agents
1 school for training technical assistants
1 school of fisheries

The number of students has risen from 150 to 3,500 in ten years, and the number of schools from three in 1956 to 25 in 1967.

Secondary level vocational schools

Obviously, it is hoped that every person trained by the secondary level vocational schools will be able to work effectively at any job in his occupational category. Attempts are therefore being made through appropriate curricula and practical work to train agents who will at least be versatile, if not capable of doing every kind of work. However, experience has shown that not all the students admitted to the secondary level schools can be taught all the subjects to a high enough level in three years to enable them to apply their knowledge equally well to all types of production in all parts of Tunisia. It has seemed advisable from the outset to plan a special program at the *Collège secondaire professionnelle horticole* (Secondary Horticultural School) of Sidi-Thabet, where horticulturists and aboriculturists for all Tunisia are trained. This was also done for the *Collège moyen de viticulture de Korba* (Secondary School of Viticulture at Korba) where special attention is given to viticulture and wine production to provide training for vine growers and wine makers for the whole country.

Since 1964 the other schools follow standard curricula as regards general education and the elements of agricultural sciences, the basic theory underlying husbandry techniques and an elementary knowledge of the concepts pertaining to specialized skills.

In addition to this common program, that to some extent guarantees a minimum basic education for the secondary vocational school graduates, each school offers a more complete and thorough study of the major subjects in which each specializes.

On leaving school, the secondary vocational level graduate has had training enabling him to engage in the various agricultural activities of his region including:

(a) setting up independently as a farmer

(b) managing a farm belonging to another person

(c) directing a production unit or an agricultural co-operative on completion of a training course in the co-operative movement

(d) working on the staff of the Ministry of Agriculture

In the last case the graduate is obliged to take courses in one of the special applied agriculture sections set up for training technical agents and assistants.

In these sections, two-year lecture courses are alternated with practical in-service training. The candidates can choose one of the following seven specialties:

crop and animal husbandry
veterinary medicine
forestry
sea fisheries
land tenure questions
laboratory work
agricultural engineering

The syllabuses are prepared in agreement with the services themselves and are taught mostly by technicians working in them. For agricultural engineering a North African school of farm mechanization and agricultural engineering has been established at Medjez El Bab and offers specializations in agricultural hydraulics, farm mechanization and water and soil conservation.

Secondary Schools of Agriculture

The same consideration applies to secondary schools of agriculture except as it relates to the the training of technical assistants instead of technical agents.

Graduates from both the vocational schools and secondary schools of agriculture can continue their studies if they have the desire and means to do so. There are many vocational school certificate holders in the secondary schools of agriculture. In the same way, graduates of the secondary schools may go on either to the National Higher School of Agriculture, or abroad, or to l'Ecole des Professeurs Adjoints (School for Training Assistant Teachers). The training they receive enables them either to obtain a job or to pursue higher level studies. There are at present many senior agriculturists who have gone through vocational secondary schools of agriculture and subsequently studied in the institutes of higher learning.

Changes have been introduced in this educational program since January 1968:

(1) all the Secondary Vocational and Secondary Schools of Agriculture come under the Secrétariat d'Etat à l'Education nationale (Secretariat of State for National Education)

(2) the schools of applied agriculture remain under the sponsorship of the Ministry of Agriculture, specifically:

School of Farm Mechanization and Agricultural Engineering
Schools for training Women Instructors
School for training technical Agents
School for training technical assistants
School of Fisheries

Both the secondary vocational and the secondary agricultural schools' curricula have been raised from three to four years.

Assessment of cadres requirements

After this brief survey of the problem of training agricultural manpower in Tunisia, we will now discuss the assessment of the country's needs for intermediate-level technical staff.

An estimate of these needs was made in 1961, at the time of the establishment of the first plan in view of the prospects for the decade 1961-1971. In 1964 we were obliged to re-examine the problem and verify our assumptions in order to adjust the targets where necessary. All services were requested to specify their staff requirements (quantitatively and qualitatively) for 1971.

The term "service" includes the following:

the technical services of the Secrétariat d'Etat à l'Agriculture - S.E.A.
production and marketing development agencies
national organizations (UNAT - UNGTT - Parti)

farmers' co-operatives
private or semi-private organizations (banks, fertilizer agencies, agricultural machinery agencies, etc.)

Practically all responded to the questionnaires. The replies were discussed with the various responsible authorities. At the same time, another assessment was made taking into account the country's projected economic situation by 1971. This work was carried out together with the person responsible for drawing up the agricultural plan for this four-year period. The resulting figures are also compared with norms adopted by certain developed countries - France and Italy. The manpower requirements shown below were the outcome of all this work. At the same time it was necessary to determine our technical potential on the eve of the four-year plan (1964-1968). A complete record of all the technicians in the Government and semi-governmental or private services had to be compiled.

The latter task was more difficult than the previous one. It was necessary to draw up a list of the names of persons in each category of technicians. At the end of 1964 exact figures on trained agricultural manpower were available - figures that could be considered about 90 percent correct.

These two research efforts, that is, the accurate assessment of our cadres requirements for 1971 and the record of the present technical staff provided a satisfactory basis for the continuation of the planning work. However, it should be mentioned that as these records were being compiled it was noted that there was great mobility of personnel changing from one government service to a more remunerative one or even to a private or semi-private organization. Many agricultural technicians were discovered to be doing work entirely outside the agricultural field (for example: tourism, the automobile industry, security services, the oil industry, etc.). That was precisely the cause of the greatest problems in the establishment of the lists of technicians.

The results of this work were as follows: by intermediate staff are meant technicians of Category B and C (technical agents and technical assistants or their equivalents). On the basis of the assessment studies it was concluded that the shortage for present needs may be reckoned as -

800 - 850 Category B agents
6,700 - 6,800 Category C agents

This means there is a need for training roughly a thousand technical assistants and eight thousand technical agents, taking into account school graduates who wish to pursue their studies further instead of going into the production sector. These figures assume an enrolment on the basis of 1,500 students in secondary agricultural Schools and 10,000 in the secondary vocational agricultural schools.

The estimated annual capacity of the schools is: 100 for Category B
525 for Category C

At this rate, Tunisia's requirements can be fully met by 1973 for Category B and 1976 for Category C.

Although the objective might possibly be reached more quickly, we are hindered at present by the lack of teachers in technical subjects.

Moreover, it is worth mentioning the following, especially with regard to graduating classes since 1961: all the secondary vocational agricultural school graduates have been recruited into the services of the Secrétariat d'Etat à l'Agriculture (now the Ministry) or by l'Ecole de la Coopération (Co-operative Movement School) and subsequently appointed directors of production units. Personally, one would like to see an increasing number of these graduates in charge of farm production and management rather than in office jobs. The aim in training technical staff is to provide our new agricultural structures with knowledgeable, progressive farmers, not to train public service employees.

Almost all the agricultural secondary school graduates, on the other hand, have left government administration and the technical services. In fact, the secondary agricultural school graduates are distributed every year among the various technical services, and every year these services inform us that their presumptive agents have not reported for work on their jobs.

According to the survey we made on this question, the secondary agricultural school graduates choose other activities as follows:

(1) continued study in Tunisia or abroad (Belgium) to obtain the degree of Ingénieur des travaux de l'Etat (lowest administrative post grade and agricultural training degree requiring 4 years of study at advanced agricultural school; post title only in Tunisia)

(2) study of the Ecole de la Coopération in Tunis, to qualify for work in the co-operative sector

(3) "more interesting" jobs in the private sector than in public administration

Teacher training

So far, foreign teachers of technical subjects have been recruited under French, Belgian and Dutch co-operation programs. However, this procedure can only be temporary. In October 1966 a school was established to train teachers for the secondary vocational agricultural schools. Students for this school are recruited among graduates of the secondary agricultural schools who then take a two-year programme in vocational education and teaching methods. During their schooling they are considered trainees and receive a basic allowance. The first senior class will be graduated in July 1968 and begin work in October 1968.

Teachers for the C.S.A. are recruited among the Ingénieurs des travaux de l'Etat (Agricultural Section) who are given additional training in pedagogy.

In addition to their regular daily schedule, the professors at the teachers' colleges can:

(1) act as educational advisers to their former pupils

(2) set up a pedagogy office for the purpose of improving vocational education

(3) provide assistance to those writing books on educational methods or preparing lesson plans

In short, the school of education will perform the role of a teaching methods office for all the schools of agriculture.

Teaching manuals

Teachers lose an enormous amount of time acquiring documentation and preparing their courses properly, especially when young with little experience in their profession. It has therefore been decided that it would be useful to prepare teaching manuals for both types of secondary agriculutral schools.

For the students, these manuals serve as reference books during their schooling and when they go to work in the field. At present manuals have been prepared on the following subjects.

- animal husbandry
- arboriculture
- vegetable production
- grain production
- vine growing and wine making
- economic and administrative training
- agricultural engineering.

Every five years the manuals are to be revised in order to keep them up to date.

The foregoing is a brief account of the training of agricultural cadres, Tunisia's requirements, and the difficulties it has encountered in recent years. Before concluding it may be useful to cite the following passage from the introduction to Tunisia's four-year plan (1965-1968):

> "An analysis of production methods considers three levels for each hypothesis contemplated:
>
> (i) so-called traditional cropping is characterized by yields of 3 quintals/hectare of grain or its equivalent.
>
> (ii) cropping which may be considered modern produces 9 quintals/hectare of grain or its equivalent
>
> (iii) technologically advanced cropping attains 15 quintals/hectare of grain or its equivalent
>
> The application of techniques developed by research can treble, and even quadruple production of most crops."

We cannot remain indifferent to this statement, and we are all convinced that the development of our agriculture from the lowest to the most advanced technical level is feasible if we agree to make substantial efforts to introduce to the agricultural production sector capable and skilled manpower which has been given good technical, social and economic training in the schools of agriculture.

EDUCATION AND TRAINING FOR HORTICULTURISTS *

By R.H. STOUGHTON

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Before beginning to consider the requirements for training horticulturists, it is well to make it quite clear what is understood by horticulture. It is only in recent years that the word has been used at all in many tropical countries except, perhaps, in the sense of gardening, or, in other words, decorative horticulture. For too long, all food production of whatever kind in these areas has been lumped together under the comprehensive title of "tropical agriculture". This has been taken to include such diverse production as livestock, cereals, vegetable growing and fruit production, as well as crops such as coffee, tea, cocoa, cotton and other fibres, sugar-cane and many others. But what, it may well be asked, is the difference between agriculture and horticulture, if the latter term is to include food crops such as vegetables but to exclude cereals and other grains?

Admittedly, with tropical crops it is more difficult to draw a clear line of distinction between horticultural and agricultural items than it is in temperate climes. Clearly, horticulture will not include livestock production and we can forget this and leave it primarily to the agriculturist, but what of tea, coffee and cocoa, all often grown on a plantation scale, in comparison with vegetables and fruits, sometimes also grown by extensive methods?

In temperate countries a rough and ready but useful distinction between agricultural and horticultural crops is that the former include all those which must undergo fairly extensive processing before human use or are grown for feeding livestock, while horticultural crops include those which are used more or less directly (or after cooking) for human consumption or for man's aesthetic enjoyment. This distinction, however, applied to tropical production would mean that practically all the crops I have mentioned except vegetables and fruits would come under the heading of agriculture, and this I could not accept.

I think a better distinction is by the approach to the crop production method. To my mind, the agriculturist is concerned primarily with the crop as a whole, while the horticulturist is concerned more with the individual plant. Take, for example, rice in contrast with oranges. The rice-grower treats the crop as a unit and is concerned mainly with soil, water and fertilizer requirements and the final yield of grain per acre; the orange-grower is concerned with the individual tree, its physiology and the effects of, for example, rootstock-scion combination or such operations as pruning, on the physiology of the tree. Basically, the agriculturist's outlook is that of a crop ecologist while the horticulturist is an applied physiologist. I readily admit that it is difficult to define a clear line of demarcation with tropical food production but perhaps my meaning and why I would include such crops as tea, coffee and cocoa under horticulture may become clearer as we consider the requirements for training in horticulture.

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* Based on a paper given to the FAO Training Centre on the Improvement of Horticultural Techniques in Fruit and Vegetable Production in collaboration with the Government of Kenya.

A second fundamental point which must be realised before getting down to matters of training is why horticultural production is important. In the developing countries two aspects of horticulture are of dominant concern, the nutritional importance of horticultural crops and their economic value.

It would seem unnecessary in these days to stress the importance of fresh fruits and vegetables in human nutrition, in the light of the efforts of FAO, the World Health Organization, UNICEF and many other bodies, but my experience in many of the developing countries is that while lip-service is paid to these facts by the authorities, in practice far less is done to implement the ideas than should be. The widespread and distressing incidence of protein deficiency, manifested so sadly in children as kwashiorkor, and of vitamin deficiencies of various kinds in populations whose diet is perhaps otherwise adequate in quantity, is evidence of the lack of appreciation of their fundamental importance. In many of these countries probably something like three-quarters or more of the population is well below full working efficiency simply through malnutrition rather than under-nutrition. This is not the occasion to discuss the nutrition aspects of proteins and vitamins: it is enough to emphasize that both of these all-important constituents of a full diet are mainly most cheaply and readily obtained from fresh fruits and vegetables when we take into account the manifest difficulties in supplying an adequate amount of animal protein.

Let us now consider the requirements in the training of the horticulturist. As I have already suggested, horticulture is basically applied physiology; it is, in fact, a science in its own right whilst still remaining an art. Any training in horticulture, therefore, unless it is aimed only at producing the simplest and most elementary grower, must depend upon giving an understanding of the underlying scientific principles upon which modern techniques are based. Any operation which we carry out upon a plant or any treatment which we give it will produce a physiological response, and unless we have some understanding of the nature and cause of these responses we are acting blindly or by rule of thumb. Physiology is therefore the key to plant behaviour and to my mind it is the centre around which the related subjects should be grouped.

But an understanding of physiology, even at a relatively elementary level, necessarily involves a knowledge of the structure of the plant, that is, of plant morphology, of some understanding of chemical reactions, especially those of organic substances, of the principles of physics, insofar as the elements of heat and light are concerned, and of at least an acquaintance with soil science.

Clearly, therefore, the basic sciences of botany, chemistry and physics must form the foundation of any course aimed at producing a horticulturist who can understand the behaviour of his plants. These subjects must, however, be taught with the ultimate aim in mind. A horticulturist does not need to be taught, as all too often he still is, chemical manufacturing processes or the composition and analysis of innumerable inorganic compounds. Once the fundamental ideas of chemical combination have been grasped, the chemistry of organic materials should form the backbone of the course. Carbon is the basic element of life, and the chemistry of carbon compounds should begin at the earliest moment rather than, as is often the case, only after more than half the course has been devoted to inorganic chemistry. Similarly, in botany it is easy to spend too much time on plant classification and on the lower orders of plants, instead of concentrating on the structure and function of the higher plants, from which, after all, nearly all our economically important plants are drawn. An understanding of the morphology and methods of reproduction of the higher plants will enable a student to use a flora for identification of plants he meets, and, even more important, provide the foundation upon which the physiology of organs and of the whole plant can be built.

The level to which these basic sciences will be taken must obviously depend upon the length and aim of the whole course of training. We may distinguish three main levels and kinds of training.

1. Training the practical instructor or grower

Usually this will not be more than a one-year course or even less. The science content can clearly be only minimal, but even here the elementary principles should, if possible, be taught. Concentration must be on the art of horticulture, but sufficient of the science at least should be included to provide some basis on which the student can build in his later reading. Too often, these shorter courses aim so much at imparting facts that sight is lost of the all-important essence of teaching, to instil the spirit of enquiry in the student to make him constantly ask why rather than merely how things are done.

2. Training the foreman, manager or junior advisory officer

This will most often be a two-year or intensive one-year course. Here more time is available for teaching principles and especially for introducing an organized course in plant physiology. This must obviously be at a fairly elementary level, but should emphasize the principles of how a plant grows and why it responds in specific ways to changes in its total environment - soil factors, nutrition, temperature, water supply, light, atmospheric factors, and the presence of other plants (weeds, diseases, etc.). Illustrations should always be taken from familiar plants, so far as possible from plants of economic value. It is important that this scientific teaching should be closely correlated with that of the art and craft of practical horticulture. In teaching the "how" of growing, the "why" should always be stressed. It is not enough, for example, to state that the seed of a particular plant should be sown at a particular depth and time; these facts should be related to soil and water factors and the morphology of the plant in the first case and to meteorological and climatic factors in the second.

3. Training the teacher, advisory officer or research worker

This will normally entail a course of three or more years, ideally in a university, in which the scientific content is at a much higher level, though still kept in balance with the instruction in husbandry. Traditionally, the first year is devoted to the basic sciences, botany, chemistry and physics, with perhaps geology or elementary zoology. While this structure may in general still be satisfactory, I am sure that the actual courses should be geared much more closely to the main subject than is usually the case. I have already indicated the kinds of stress that I think should be given in these fundamental sciences and this need not be elaborated further. The subjects for the whole course should be integrated and continuous so that the bug-bear of the good teacher is avoided - the tendency of the student to pigeon-hole his subject and to say to himself, "that has got physics (or botany, or chemistry) behind me".

I have said nothing so far of the importance of demonstration and practical work in horticultural training. Demonstrations of skills in practice are obviously of value, provided that they do demonstrate real skill. Here again the demonstrator should explain the reason for each part of any operation and never be content merely to say, "do it this way". Only too often demonstrators use the opportunity to show off their own prowess, rather than to use their skill to explain the operation.

The importance of practical work by the students is a more controversial matter with educationists, but personally I have no doubt that it is an essential part of the training at any level. It is not possible in a two or even a three-year course to turn a beginner into a skilled craftsman, but if he has at least performed most of the operations with his own hands under skilled supervision he will appreciate that what looks easy may really be difficult to do well, and if he himself is to become a teacher of others it is obvious that he must learn the craft to the maximum of his ability.

There is, however, a big difficulty of a psychological or sociological nature in the teaching of practical skills in the developing countries, especially in many parts of Africa. The higher the level of training the more difficult it is to make the student interested in, or indeed prepared to perform, manual operations. Agricultural and horticultural pursuits have for so long been peasant work that many students think it beneath their dignity to work with their hands on the soil. I have myself known cases where university students have threatened to go on strike if they were called upon to plough or hoe the land. There is no ready answer to this save for the teacher to create the attitude of mind that there is no indignity in manual work and to show it by his own example. In my view no amount of theoretical instruction or practical demonstration can take the place of actually performing the task with one's own hands.

To sum up, horticulture should be looked upon as a science in its own right, based upon a craft. Both science and craft are essential parts of training, but they should not be treated as separate parts of a course but as an integrated whole. It cannot too often be stated that the essence of good teaching is to stimulate interest and the spirit of enquiry. The best student is the one who always wants to know "why" rather than to accept unexplained facts. Too many teachers look upon the inquisitive student as a nuisance, instead of realising that it is curiosity that has differentiated man from other animals and made possible the modern technological explosion.

FAO'S WORK IN VETERINARY EDUCATION

The first written reference to veterinarians which is known is the four thousand years' old Hammurabi's Law in which their fees were fixed. It was, however, only in the eighteenth century, when a devastating outbreak of Rinderpest had swept Europe, that schools of veterinary medicine were established; the first one in 1762 in Lyons. Over the following years, schools and faculties of veterinary medicine were established in rapid succession in the rest of Europe, first, then in the other regions of the world.

Over these two hundred years, the scientific foundation of veterinary medicine has been laid and a close symbiosis with human medicine established, which has changed the role of the veterinarian so considerably that today a large percentage of veterinarians are serving society in fields outside of agriculture.

In a hungry and malnourished world the veterinarian in the agricultural industry plays a vital role, since the most serious aspect of undernourishment is lack of animal protein. Improvement of the world's livestock industry is therefore a question of survival, and in all developing countries such improvement must start with disease eradication and disease control.

The Animal Production and Health Division of FAO has given greater and greater emphasis to veterinary education during the last few years. The result may be said to be one of FAO's most significant and successful activities. For the first time in the history of veterinary medicine, internationally acceptable standards for veterinary education have been established. The pioneer in this work has been Sir Thomas Dalling, and the funds have been supplied mainly through a special grant from the Danish Government.

After much preparatory work the official start was the FAO International Meeting on Veterinary Education in London 1960, which recommended that an Expert Panel on Veterinary Education be established to study in detail all aspects of the problem, ranging from the global need for veterinarians to the general acceptance of a certain minimum curriculum requirement. In view of the part played by veterinarians in such non-agricultural fields as public health, cancer-research and gnotobiotics,* it was natural that the Panel should become a joint FAO/WHO activity. The results of its studies and its recommendations were published in two reports 1962 and 1963, and they were finally adopted for international use by the Second FAO/WHO International Meeting on Veterinary Education in Copenhagen 1965. The entire undergraduate curriculum was finalized at this meeting, and guidelines for both postgraduate education and training of lay personnel were laid down. The two latter subjects are to be dealt with in greater detail at the Panel's next meeting in 1969, and in preparation for this a small ad hoc meeting on training of lay assistants was held in 1968 in Beirut with UNDP/FAO field experts and their national counterparts as participants. The findings of this meeting will form a working document for the Panel.

Recognizing that problems vary from region to region, even in veterinary education, FAO convened, again in close collaboration with WHO, a regional meeting in Maracay, Venezuela in 1966 (First FAO/WHO Latin American Meeting on Veterinary Education). Further regional meetings are planned and will take place as funds become available.

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* The technique adopted for developing animals which are free from specific infections and parasites.

In addition to this work the Panel has advised several individual member countries on their specific problems in the field of veterinary education. This is normally done by sending some members of the Panel to the country where they study the problem on the spot and report their findings and suggestions to the Government. It might be added that Panel members receive no honorarium but merely reimbursement of travel expenses for this and all their other services to FAO.

In the field FAO's veterinary assistance always contains an element of education and training; and many programmes deal specifically with this aspect of the work. The basis is the fellowships programme - in collaboration with FAO's Fellowships and Training Branch - which includes André Mayer fellowships and grants under TA, UNDP(SF), FFHC, and Funds in Trust. At any given time the Animal Production and Health Division is responsible for supervising more than one hundred veterinary fellows studying abroad, and the majority of these fellowships have to be arranged individually with study programmes adapted to the needs of the country and the qualifications of the candidate.

It is, however, more efficient to base long term planning in veterinary training programmes on permanent training institutions, and, in recognition of this, the Danish and Swedish Governments have made funds available for several years to support the following centres:

- Veterinary Faculty for FAO Fellows and Scholars, Copenhagen; annual postgraduate course for veterinary lecturers and professors in teaching methods and administration, duration one academic year. In addition, several African students are given the full undergraduate veterinary course.

- FAO/Swedish International Postgraduate Course in Veterinary Pathology, Stockholm; biennial, duration one academic year.

- FAO/Swedish Veterinary Postgraduate Course in Animal Reproduction, Stockholm, biennial, duration one academic year.

- FAO/WHO Training Centre for Meat Inspectors, Kenya; annual, duration 4 months.

- FAO/WHO Training Centre on Meat Hygiene, Denmark; biennial, duration 5 weeks.

- FAO/WHO Training Centre on Abattoir Management and Operation, Denmark; biennial, duration 5 weeks.

It is hoped that additional permanent training centres of this type can be created and funds are being sought for this purpose.

In the Division's UNDP(SF) field programme, four projects are assisting veterinary faculties:

- Veterinary Education, National Autonomous University of Mexico.

- Animal Production and Veterinary Training, University of Santo Domingo, Dominican Republic.

- Faculty of Veterinary Medicine and Animal Husbandry, National University, Bogota, Colombia.
- Assistance to the Faculty of Agriculture and Veterinary Medicine, Quito, Ecuador.

There are also four projects to assist member countries in establishing schools for lay animal health assistants:

- Animal Health Assistants School, Debre-Zeit, Ethiopia.
- Animal Health and Industry Training Institute, Kabete, Kenya.
- Training School for Animal Health Assistants, Mogadiscio, Somalia.
- Training and Demonstration in Animal Health and Animal Husbandry, Baghlan, Afghanistan.

Several other projects of this type are under consideration.

After many years of field experience the Animal Production and Health Division of FAO has become firmly convinced that its limited resources for assisting member countries in the field of veterinary education, are best utilized by concentrating on two activities: postgraduate veterinary education centres, and training schools for animal health assistants. At these, the postgraduate research worker will carry veterinary science forward and learn to communicate his findings to his students and to the livestock industry, while the animal health assistant in many countries becomes the final link in the chain for communicating new knowledge to the livestock owner.

It may be stated without complacency, that although much remains to be done in the field of veterinary education, the work of the Animal Production and Health Division has so far been a good example of the dual purpose of FAO: to compile and disseminate technical information, and to give practical assistance to its member countries whenever they request it.

BORGO A MOZZANO
A PROJECT AND TRAINING CENTRE FOR RURAL EXTENSION

by L.E. VIRONE

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In the spring of 1954 the Comune of Borgo a Mozzano in Tuscany was chosen, following a survey of various regions in Central Italy, to typify the peasant farming of the country.

At that time in Italy the people employed in agriculture were still 41 per cent of the national active population and 93 per cent of the land holdings in the country were less than 5 hectares (12.3 acres) in size. The small farm as a family business was the most important aspect of the Italian agricultural structure. It concerned a very large section of the Italian population. Its low productivity resistance to the adoption of modern techniques, modest economic return and consequent low standard of living meant that a large part of the people scarcely participated in and hardly contributed to the national economic development.

From the one side the magnitude of the problem discouraged detailed analysis and intervention, and from the other side the complexity of the rural world required both much deeper understanding and also, assistance at close quarters if family farming had to be brought into the stream of a society and an economy in rapid evolution.

The first attempt at the solution of the problem could, therefore, only be tried out by venturing on a pilot project of rural development in a limited area which had to be representative, or at least not exceptional, and the project had to be carried out in such a way that the experience gained there could, later, be repeated on a large scale in the country. Shell ItalianaS.p.A. decided to sponsor such a project which, from the name of the chosen community, became known as the Borgo a Mozzano Project; it may be interesting to note here that perhaps only a private sponsor, free from territorial, administrative and bureaucratic bonds, could have undertaken such an experiment and persevered with it.

The comune and its survey

Borgo a Mozzano is a comune (the smallest Italian administrative unit) in the province of Lucca and has a population of about 8,000. It was eminently rural (86 per cent of its active population was primarily concerned with agriculture) and had some 1,300 small farms, mostly worked by the owner himself. Its geographical position, across the deep Serchio valley provided the opportunity to embrace aspects of the three principal types of agricultural economic regions of Italy: mountain, hillside and plain.

The total area of the comune is some 6,700 hectares (16,500 acres), sub-divided into 16 hamlets, at altitudes varying from 100 metres to 1,000 metres above sea level. More than 60 per cent of this could be defined as mountainous, 27 per cent as hillside and 10 per cent as plain. About 80 per cent of the territory slopes steeply with gradients of more than 1 in 15. The soils in the area show a good deal of variation, but, generally speaking, are poor and acid. The rainfall is high (yearly average 1,592 mm). The land ownership is highly fragmented and, in 1954, the average holding was only about 1.69 hectares (4.25 acres). The average farm appeared to be considerably larger - some 5 hectares (12 acres) - but this was broken into various parcels of land scattered, often at a considerable distance, one from another.

The produce was derived both from the forest which represented more than 60 per cent of the total farm area, from chestnuts which were rapidly deteriorating due to disease and also from arable land, mostly terraced, on which herbaceous crops (mainly wheat, maize and potatoes) were cultivated together with olives and vines. The average yields were low on account of inferior seed, inadequate fertilizing and outdated cultural practices.

Cattle were reared for the production of veal and milk and were also used for draught; this, together with the poor fodder available made their production very low. On most farms there were also a pig and some poultry for family consumption and mules, donkeys or horses for transport. Of the total farm production about half was sold and half consumed by the farmer's family. Purchases for farm input and the use of machinery and equipment were very restricted. It is not surprising, therefore, that production was very low and, in consequence, incomes were extremely modest.

The detailed survey of farming and its economic and social implications at Borgo a Mozzano represented the first phase of the project. This was initiated in June 1954 when a young University Graduate in Agriculture was recruited and domiciled at Borgo a Mozzano. His first task was the collection of the data for the survey which was to be prepared by the Institute of Agricultural Economics of the University of Florence. In this way from the inception of the project the important pattern of relationships and communications was established between the farmers of the community and agricultural research through the medium of the agronomist in charge of the project. The survey period, during which the agronomist was exclusively occupied on the collection of the data, lasted eight to ten months and provided a detailed analysis of the farming then practised at Borgo a Mozzano. Its publication contributed to a deeper understanding of the facts and problems of the rural communities in the country. Moreover, the survey and the survey period, seen in the perspective of the project which was to follow, appear as an essential instrument for rural development. They provided an opportunity to understand the intricate relations between the social, economic and technical factors in that rural community, and thus gave to the agronomist the objectivity required for formulating a programme of rural extension geared to the problems and aspirations, possibilities and limitations of the farmers. Another important function of the survey has been to provide a record of the conditions when the project started on the basis of which the results of rural extension and development could be evaluated.

The project and its results

The survey completed, the Borgo a Mozzano project could then enter the second phase: rural extension. The aim of the project here was to demonstrate that the cost of advising the farmers would be justified by the increase in net income which would be obtained by the farming community. This economic demonstration was important because, if successful, it would make an important contribution in convincing others of the need to embark on rural development on a larger scale. Furthermore, its economic demonstration provided a realistic yardstick with which to discipline the activities of rural extension and evaluate the validity of its impact. The rural extensionist, however, was deliberately not in a position to provide the farmers with financial support or free materials, this in view of the need to ensure that the project would be repeated elsewhere, and also in order to avoid establishing a false relationship between the agronomist and the farmers. He had to be an adviser and not a source of finance. If investment was required for improvement this would have to be provided by the farmers themselves or from Government allowances available to all peasants in Italy. The agronomist had to rely only on his understanding of the problems and his ability to persuade farmers to adopt suitable solutions. The increase in net income from farming could thus only be obtained by the understanding and effort of the farmers themselves who became, in fact, the principal actors in their own development. The programme, therefore, depended very much upon their inherent psychological and financial capabilities, and could only expand as these capabilities improved. Consequently it was implemented gradually, starting with very simple innovations (such as the use of better seed or fertilizers for annual crops) with a few farmers and then expanding to include more complex activities involving an increasing number of farmers (for example, road improvement and co-operative organizations). Thus it eventually reached the entire farming community and dealt with practically all aspects of agriculture. In 1957, an instructor in home economics joined the agronomist in his work with the aim of extending the project to the women of the community.

The outcome of the project has been a considerable increase of yield per acre of some traditional crops (wheat yield has been doubled, maize trebled and potatoes more than trebled). The production of certain items, such as poultry, has been greatly expanded, the quality of other products, such as wine, has been improved; new activities such as mechanized transport of agricultural products and milk processing have been introduced, and so on. To sum up in economic terms the gross saleable production from agriculture and forestry increased in the 10 years 1954/1964 on average 3.5 per cent every year (one point higher than the Italian national average). The net agricultural income during the same period passed from 378.2 million Lire to 581.9 million Lire, an increase of 54 per cent or an average annual increase of 4.5 per cent. The cost of advising the Borgo a Mozzano farmers, which now runs at about 8 million Lire per year, even if it were considered responsible for only half of the increase of net income achieved, still accounts for the remarkable return of some 1300 per cent. It may be interesting to note that the increase in the net income in agriculture was already greater than the cost of rural extension at Borgo a Mozzano within three years of the inception of the project.

The Training Centre

The positive results of the Borgo a Mozzano Project soon aroused interest and encouraged others to apply the same methods and principles elsewhere and it was evident that for this purpose agronomists would need specialized training. Hence Italian organizations concerned with rural development, such as the Cassa per il Mezzogiorno, the Agrarian Reform Authorities and the Ministry of Agriculture, started to send agronomists to Borgo a Mozzano with a view to their being trained to use the same methods in other farming communities. Therefore a new phase started in the Borgo a Mozzano Project with the gradual establishment of a training activity parallel to the rural development project.

Initially, individual agronomists attended a kind of "on-the-job" training on the project for some months, but then the increasing number of requests together with the need to complement the background of the trainees with some theoretical training, led to the organizing of formal courses for groups of agronomists. The first such course was held in 1959 for agronomists of the Cassa per il Mezzogiorno. By the end of 1967 the courses for Italian agronomists had been attended by a total of 315 trainees. Agreement has been reached this year to establish an official post-graduate course in extension, the first of its kind in Italy, in cooperation with the University of Pisa and the Italian Ministry of Agriculture.

The training activity, originally limited to Italians, aroused the interest of the numerous experts who visited the project from abroad and, in 1962, the first international course was held at Borgo a Mozzano in that case for Latin American agronomists. With the co-operation of various national and international organizations, and in particular the Food and Agriculture Organization of the United Nations and the Pan American Union, training of experts from abroad has now become a normal feature at Borgo a Mozzano. By the end of 1967, 345 trainees from 71 countries of Africa, Asia and South America had been trained at Borgo a Mozzano. Therefore the international Training Centre grew up at Borgo à Mozzano with facilities for simultaneous translation and for literature in various languages to cope with the trainees and visitors from abroad. The great advantage of running residential courses at Borgo a Mozzano is that the project itself acts as a living laboratory in rural development and extension.

The scope of the training carried on there acquaints trainees with the methods used in and experience gained from the project, and provides them, as previously stated, with other theoretical knowledge required for the application of rural extension and rural development. For this purpose the work done at Borgo a Mozzano is analysed in detail and continuously compared with the conditions in the countries of origin of the trainees. The choice of a suitable community for a project, the survey of the community, the programme of rural extension and the evaluation of results are subjects examined and discussed in detail by the trainees with the personnel of the Centre and also with the farmers. Furthermore, the discussions on subjects such as rural sociology and psychology, the relationship between research and extension, means of communication, peasant farm management and marketing of agricultural products, are conducted by experts from Italian Universities and international organizations. During the courses frequent visits are organized to farms, co-operatives and research establishments. At the end of the course, the trainees have to produce a report in which they examine the problems of rural development in their countries and the possibility of applying there the methods of rural extension used at Borgo a Mozzano.

The final expectation from the training activities is to see rural extension applied on a larger scale. In Italy the principles and methods of Borgo a Mozzano are now applied on some 14 per cent of the Italian agricultural area. In recent years the lessons of Borgo a Mozzano have inspired people in various countries to venture on similar projects. Shell companies, either alone or in co-operation with national organizations, have introduced similar projects in countries as far apart as Trinidad, (Lot 10 Project), Nigeria (Uboma Project) and Thailand (Saraphi Project) among others. Current thinking and policies concerning development have matured through some thirty years of controversy between agricultural development and industrial development which have brought into focus the importance of rural development for the betterment of low income countries. Borgo a Mozzano can well claim some credit for having contributed towards this evolution.

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CONOCOTO FORESTRY TRAINING CENTRE

By R.C. BOIX

The Project Manager

Introduction

Ecuador has repeatedly been called a country of contrasts. Its geography, cut across as it is by the Equator and from north to south by the Andes, explains the variety of climate, scenery, flora and fauna of the country and this appellation. The traveller is able to admire the immense banana plantations on the tropical coast and, within a few hours, can find himself in the perpetual snows on top of the Chimborazo and Cotopaxi volcanoes. It takes very little time also to go from the luxuriant rain forests around the Río Mira to the arid desert banks of its tributary, the Río Chota.

For these reasons - its geographical position, climate and mountain chains - Ecuador is a pre-eminently forest country. Over 70 percent of its territory is wooded or land (though denuded) suitable for forest bearing.

Yet it was only in 1956 that the country organized a Forestry Service which, in 1962, became the Forestry Department. Despite the spectacular expansion of the lumbering and wood-using industry within the past decade it is still a relatively minor branch of the nation's economy.

General Economic and Social Development Plan 1964-1973

In 1964 the Government launched a ten-year development plan to promote production in all sectors and improve the living conditions of its people.

The goals for the forestry sector, as set forth in this plan, were as follows:

(a) conservation, management and working of 1,400,000 hectares of productive forests along the coast

(b) afforestation of 145,000 hectares of denuded land capable of forest bearing

(c) conservation of 2 million hectares of protection forest.

A task of such enormous scope can only be carried out through adequate training of sufficient manpower at all levels.

In view of the dearth of foresters, the plan called for the reorganization and strengthening of forestry training in the country and it was for this purpose that the Centro de Capacitación Forestal de Conocoto was created.

Background of the project

In Ecuador prior to 1962 forestry as such was not a subject of study although elements of it were studied under the subject 'Dasonomía' at three schools of Agriculture and Veterinary Medicine. The first courses for forest rangers were started at Conocoto in a small functional building constructed with funds from what was then the Instituto Nacional de Colonización (National Land Settlement Institute).

When the forestry development plan got under way it was considered indispensable in order to accomplish its purposes to enable persons holding the degree of Ingeniero Agrónomo to specialize and to train about 15 foresters and 40 forest rangers each year. To this end the Government of Ecuador, in 1964, applied to the United Nations for assistance in broadening and improving the training given at the Centro de Capacitación Forestal de Conocoto.

The Special Fund's Governing Council approved the project in January 1965 and in September of the same year the Government of Ecuador, the United Nations Special Fund and FAO signed the Plan of Operation for the project entitled 'Forestry Training Centre, Conocoto', that officially began operation on 2 November 1966.

The Project: purpose and description

The purpose of the project was to improve and expand facilities at the centre in order to meet the demands of what was at that time the Administración Forestal (Forestry Administration) for foresters and forest rangers and to train foremen and skilled workers for forest industries.

For that purpose the project called for the conduct of regular courses for forest rangers admitting twenty students annually for the two-year course including six months of practical field training. A high school certificate and the passing of an examination was required for entrance.

Forty forest rangers were trained in six-month courses, for entrance to which a primary school certificate and passing of an entrance examination was required.

The courses for foremen and skilled workers for forest industries also lasted six months, 15 students being admitted each year.

In addition to these regular courses, short, intensive or "crash" training programmes for persons holding the degree of Ingeniero Agrónomo and already employed in the Servicio Forestal (Forest Service) were offered and forestry extension programmes organized to promote a 'forest consciousness' among the population.

The project will last five years. The Special Fund allocation was $798,200 and the Government contribution to local operating costs $79,700. The original staffing plan called for 252 man/months of labour, five experts, 10 fellowships abroad of one year duration each and $100,000 worth of equipment. The Government counterpart contribution was equivalent to $552,780, and covered in particular national staff, fellowships for training at the Centre, and buildings.

Present status of project

Although the official starting date of project operations was 2 November 1966, the Manager and Co-manager were recruited in advance in August of that year and spent several months in careful selection of staff, ordering of equipment and detailed preparation of the project to ensure that it would have every guarantee of success. In particular, a detailed work plan for the entire duration of the project was drawn up.

Project headquarters were located close to the town of Conocoto, about 15 km. from Quito, on a 40 hectare farm owned by the Dirección General de Bosques (where the central nursery and various forestry experiment plots of the Servicio Forestal were also located).

Conocoto lies in the Valle de los Chillos at an elevation of 2,500 metres, and, like most of the inter-Andean valleys in Ecuador, enjoys spring weather all year round.

The project also - with a view to enabling students to familiarize themselves with the very diverse ecological conditions of the country - has several mountain forest experiment stations at Cotopaxi, at 3,650 metres elevation, one subtropical site at La Favorita, at 1,500 metres and tropical sites at La Cedrela and Borbón in the Costa region.

In signing the Plan of Operation, the Government undertook to remodel the old centre's premises and construct nine new buildings. Work on these buildings was begun in September 1966 and completed in March 1967. At the present time the premises consist of three buildings: in the first are dormitories for 50 students, the dining room, kitchen and miscellaneous facilities; classrooms, library, laboratories, etc. are housed in the main building while the professors' rooms are in a separate pavilion. Sports fields have also been laid out and only part of the workshops and heavy equipment storage facilities remain to be built.

Because the buildings were still under construction, the first regular course for foresters could not be given until January 1967 when 27 students were accommodated (seven from the previous course antedating the project). The present 1967-68 school year started in November 1967 but henceforth courses will begin in October.

Students live in and have 30 hours of school per week, of which 10 consist of practical work, mainly in nurseries and plantations, surveying, forest mensuration, use of forestry equipment and implements, and lumbering. In addition, three times a year they are taken on study tours to the various experiment stations of the project where they get accustomed to camping in the woods or learn to plant both saplings of 'teca'* and 'caoba'* at sea level at 35°C, and - quite a different affair - pines on the slopes of the Cotopaxi volcano at 3,700 metres elevation and at 2 to 3°C. During their summer vacations the students do field work for the Servicio Forestal.

Thus, when they graduate, they will have acquired an excellent theoretical and practical background.

All graduates of the 1966-67 course are now working in the Servicio Forestal. Of the students who will complete their studies this year, several have been offered jobs in private industry while others will be employed by the Dirección General de Bosques.

Last summer the first "crash" course for employees of the Servicio Forestal holding the degree of Ingeniero Agrónomo was organized. The theoretical work was given at the Conocoto centre while practical work was done in the forests of Borbón (province of Esmeraldas).

For next summer, July to October 1968, two courses have been organized, one for forest rangers and the other for forest industry foremen and skilled workers. All these courses will be repeated regularly.

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* 'teca': tectona grandis
'caoba': swietinia macrophylla

The international staff of the project now consists of the project Manager (an expert in forest policy, forest mensuration, etc.) and four experts in (a) silviculture, (b) forestry industry, (c) forestry engineering (felling, logging and transport) and (d) forest protection, soil conservation and wildlife management.

The Government counterpart staff is composed of the project Co-manager and four counterpart instructors, all full-time. There are also six part-time instructors, including a doctor who teaches first aid, health and hygiene.

All projects, and in particular educational ones, must train staff to take over project operations when the Special Fund assistance comes to an end. That is why special emphasis is laid on a fellowships programme for the Government's instructor staff. One instructor has already completed training in silviculture during a year's stay at the Escuela Forestal de Chapingo (Chapingo Forestry School), Mexico; another is taking a postgraduate course at the Inter-American Institute of Agricultural Sciences at Turrialba, Costa Rica, and two others will shortly be sent to the United States and Costa Rica to specialize in forestry economics and forest mensuration. Additional fellowships will be used in the next two years.

In order to have equipment on hand as early as possible, orders were placed even before the official start of operations. By now equipment to the amount of $50,000, or half of the Special Fund allocation, has been delivered. It consists mainly of books for the centre's library, audio-visual aids, field equipment, and instruments for forest mensuration and logging, loading and haulage machinery. All of this equipment is modern, highly practical, easily handled and suitable for conditions in the country.

Such, briefly, is the present status of the project one and a half years after its inception. The work plan is being carried out according to schedule. Despite the short period of operation, initial results are already evident and this points to the project's success - whatever has been accomplished thus far being attributable to full collaboration at all times by the Dirección General de Bosques on behalf of the Government as well as the enthusiasm and teamwork of all national and international staff.

As no major obstacles are anticipated it can be assumed that the project will follow the course traced out for it, and that when it comes to an end it will be taken over by the counterpart staff without interruption.

Future plans

The Servicio Forestal has up until now absorbed all graduates of the Conocoto centre. Beginning in 1968, the yearly graduating class will number 15 to 20 foresters, about 40 forest rangers and 15 foremen for forest industries, only a few of whom will be employed by the Servicio Forestal.

Private industry is already seeking for trained foresters and the demand will increase greatly in the next few years because the Government, on the groundwork laid down by another forestry project, also undertaken with Special Fund and FAO aid, has just granted concessions to 13 major lumbering concerns to work over one million hectares in forests of northwestern Ecuador. These concerns will be expected to do logging under a scientific management plan and set up integrated forest industries. Most of the future graduates of the Centro de Capacitación Forestal de Conocoto will find employment with them.

The Government also has several other ambitious forestry schemes in prospect, some of which will shortly enter the operational phase. One, the Palmira Plan, calls for the planting of 50,000 hectares of Pino insigne*and, later on, setting up an industrial pulp and paper plant to supply the country with the products it is now obliged to import to the extent of 100 percent.

Another idea taking shape calls for the creation and attachment to the Conocoto centre of a forestry institute for basic research and experimentation combined with specialized forest services, namely research on tree pests, seed production, etc., services the Dirección General de Bosques is still lacking.

For all these reasons it is believed that, in the future, the Conocoto staff and facilities will have to be expanded and additional housing accommodation built for its technical and administrative staff. In this way the Centro de Capacitación Forestal de Conocoto is fulfilling its purpose by training the necessary manpower for forestry work and for the forest industries, keeping pace with the growth of the latter and thereby contributing significantly to the economic and social development of the country.

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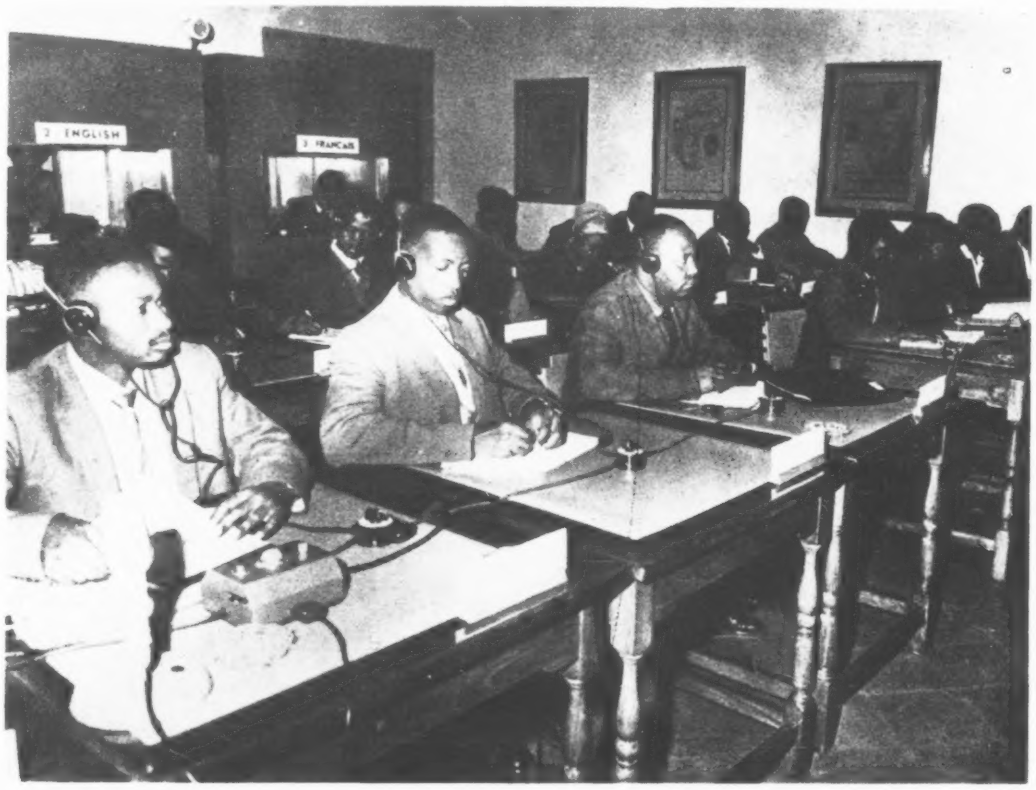
* Pino insigne: Pinus radiata

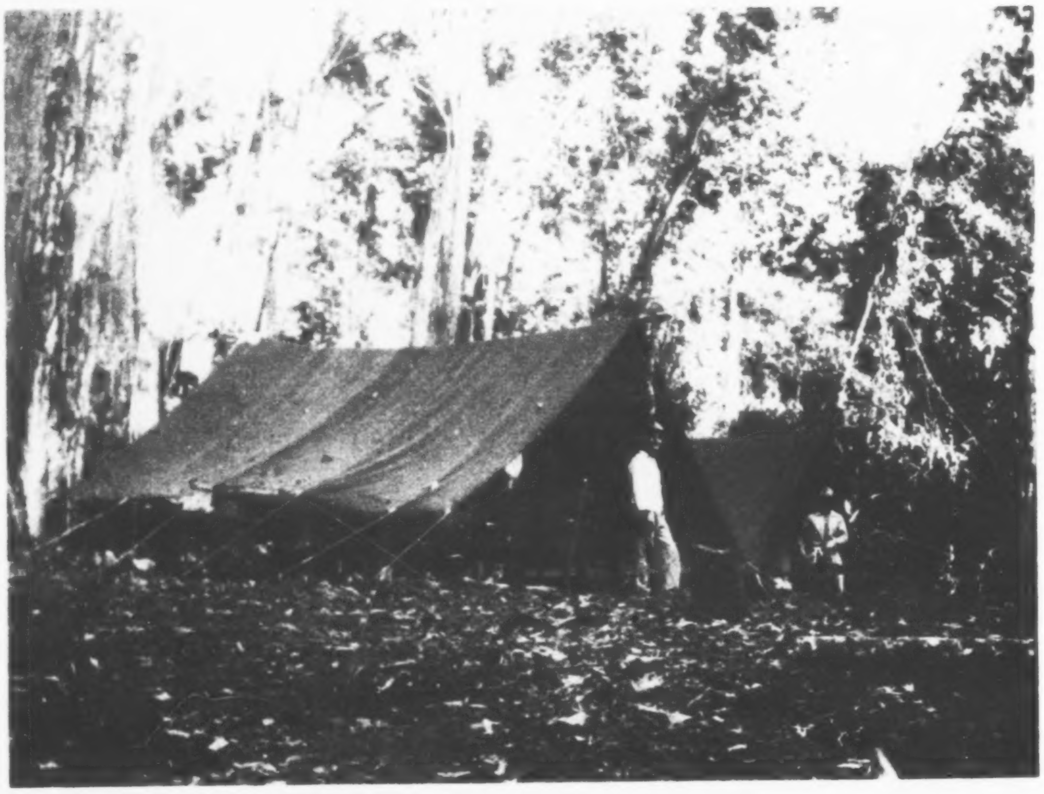
THE USE OF A MOTORIZED TRAILER BEING EXPLAINED TO AFRICAN TRAINEES VISITING A BORGO A MOZZANO FARM. THE PROJECT OF BORGO A MOZZANO IN ITALY OFFERS THE GREAT ADVANTAGE OF A LIVING LABORATORY IN RURAL EXTENSION FOR TRAINEES ATTENDING COURSES.



MEMBERS OF A COURSE FOR AFRICANS ATTENDING A LECTURE IN THE BORGO A MOZZANO TRAINING CENTRE. BY THE END OF 1967, 315 ITALIANS AND 345 FROM 71 OTHER COUNTRIES WERE TRAINED THERE.
(See article on page 37)

PRACTICAL WORK FOR SECOND YEAR CONOCOTO (ECUADOR) FOREST RANGER STUDENTS
(See article on page 42)

FORESTRY TRAINING CENTRE - CONOCOTO (ECUADOR)



CAMP FOR FOREST RANGER STUDENTS, 'LA CEDRELA', ECUADOR.

ONE OF A GROUP OF TRAINEES AT THE FARMERS' TRAINING CENTRE, URAMBO, EASTERN TANZANIA, TELLS A GOVERNMENT PUBLICITY OFFICER OF PLANS FOR THE FUTURE OF HIS FARM IN AN INTERVIEW USED FOR A FARM RADIO BROADCAST. THE CENTRE WAS BUILT UNDER FAO'S FREEDOM FROM HUNGER CAMPAIGN.

COMMUNITY LISTENING TO FARM BROADCASTS IN A PAKISTAN VILLAGE
(See article on page 47)

ONE OF THE TEACHERS WORKING ON A SMALL ENGINE AT A RECENT
IN-SERVICE TRAINING SESSION IN KENYA ON ENGINE CARE AND MAINTANANCE
(See article on page 55)

AT THE CLOSE OF A RECENT YOUNG FARMERS' CLUB RALLY, WILLIAM O. OMAMO, PRINCIPAL OF EGERTON COLLEGE, KENYA, PRESENTS THE WINNING TROPHY.

IN THE BACKGROUND, JOSEPH MURIUNGI GIVES POINTERS TO HIS STUDENTS IN THE NJORO SCHOOL, KENYA, REGARDING JUDGING AND SELECTION OF DAIRY CATTLE.

AGRICULTURAL INFORMATION AND FARM BROADCASTING

By A. DEFEVER

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There is a large pool of knowledge on improved methods of farming in many countries throughout the world. The main problem is to communicate this knowledge to areas where it is most needed and to persuade the rural people to put it into practice.

Illiteracy, size of the countries, low density of population, inadequate road networks and shortage of trained personnel are among the main obstacles preventing the dissemination of the knowledge needed to increase agricultural production.

Their task is growing even more complicated, for modern agriculture not only requires vocational training of the farmer, but also of his wife, sons and daughters.

Mass communication media are still under-estimated by many educationists and political and social leaders, although they could greatly contribute to the development of agriculture and allied industries.

The impact of printed material such as leaflets and booklets is limited in those countries having a high degree of illiteracy.

Rural television is not common yet in the developing countries and where it exists it only covers limited areas. Newly established TV stations do not usually possess specialists trained in rural TV.

Radio, therefore, remains the prime medium for communicating with country people, even in the most remote parts of the world. It does a great deal to help the farmer to solve problems involved in the adoption of new production methods: use of improved seeds, fertilizers, pesticides, new cultural and breeding techniques, improved storing and marketing systems, etc.

With a small team of extension workers and home economists, helped by a few farm broadcasting specialists, good daily farm broadcasting programmes can be organized. Farm broadcasting furthermore is the most economical means of agricultural extension work.

The 11th Session of the FAO Conference in November 1961 decided that high priority should be given to helping Member Governments to strengthen their agricultural information services through the use of modern mass communication techniques and especially farm broadcasting.

Seminars, fellowships and experts

At the outset of its farm broadcasting programme, FAO decided to concentrate on the training of personnel needed to establish and expand farm broadcasting services in the developing countries. The best way to achieve this was by holding regional farm broadcasting seminars. The first was held in Cairo in March-April 1963. Similar seminars followed at New Delhi in January-February 1964; Nairobi in November-December 1964; Mexico in October-November 1965 and Santiago in July-August 1966.

The aim of these regional seminars was to teach modern techniques of farm broadcasting to a wide range of people involved in the provision of information to farmers. These include radio officials, teachers from schools and colleges, ministry of agriculture officials and people concerned with marketing and weather reports, agricultural research, fisheries, rural women and rural youth organizations. The seminars were planned in close association with the governments and broadcasting organizations of the countries in which they were held.

The success of these regional farm broadcasting seminars encouraged FAO to develop its work in this field and during 1967 the first three national seminars were held. These took place in Malaysia, Saudi Arabia and Turkey in cooperation with the governments of those countries.

In addition to the seminars already mentioned, which were devoted almost entirely to training, FAO has also organized two other regional seminars which considered in some detail the future development of farm broadcasting in the regions concerned. The recommendations of these seminars have been particularly valuable to FAO in the planning of its activities in these regions. These seminars were held in 1966, one at Gisenyi (Rwanda), dealing with farm broadcasting for French-speaking African countries, and one in Tokyo for south-east Asian countries.

FAO has made fellowships available for farm broadcasters of developing countries to continue their studies in other countries and 33 fellows have so far benefited. This aspect of FAO's work is extremely important. The seminars in both Tokyo and Gisenyi passed resolutions which stressed the need for more training of farm broadcasters. Whilst regional and national seminars have proved, and are proving, their worth in this field, the longer and more detailed training which fellowships allow is an activity which FAO intends to continue.

During the past two years FAO has arranged for farm broadcasting experts to advise the Governments of Dahomey, Algeria, the Ivory Coast, Liberia and Upper Volta. Several other countries have also asked for assistance in this field. In addition, FAO has provided short-term advisory farm broadcasting consultants to Ghana, Sierra Leone and Burundi.

Certain governments and broadcasting organizations have expanded and strengthened their farm broadcasting activities, either as the result of a seminar or the visit of a farm broadcasting consultant. These countries include UAR, India, Malaysia, Cambodia, Nigeria, Guatemala, Greece, Turkey, Libya and Afghanistan.

A survey covering 21 countries revealed that in the three-year period 1963-65, the number of radio stations broadcasting farm programmes increased from 198 to 250. The number of national farm programmes increased from 20 to 40 and local farm programmes from 48 to 139. This expansion resulted in 6,448 minutes of weekly farm broadcasting in 1965 as against 3,637 minutes in 1962. The same survey revealed that the number of radio sets, including wired and village sets, in 21 countries increased from just over 7 million to nearly 43 million, and the estimated farm programme audience increased from 25,100,000 to 56,700,000.

This rate of expansion would appear to indicate a growing need for more trained farm broadcasters to establish and expand programme services and, if possible, the supply of more radio equipment, particularly receiving sets.

Training Centres

FAO is at present encouraging the establishment of three specialized farm broadcasting training centres in each of the three main developing regions: South-east Asia, Africa and Latin America. A mission from UNESCO recently visited Asia and is now preparing a report on the possibilities of establishing a general broadcasting training centre in Asia, and FAO has suggested that a special school for training of farm broadcasters should be incorporated in this project. A joint bilingual farm broadcasting training centre in Africa is under discussion to train both French-speaking and English-speaking students on a parallel course using interpreters. The Government of Mexico has put forward a request for assistance to establish a farm broadcasting training centre in Mexico to serve Latin America.

This regional approach is necessary because in various countries of the world, radio has reached many different levels of development and shows numerous variations in the organizational structure and programme content. In some countries radio has still not reached the rural and outlying areas, whilst in other more developed regions television, as well as radio, reaches almost 100 per cent of the population. Figures published by UNESCO in 1960 showed that North America, (including the northern zone of Latin America), had 72 radios per 100 people, as against 11 in South America and 2 in Asia. However, recent surveys have shown that radio is spreading very rapidly in many developing countries, although there are still 12 FAO member nations with less than 5 radio receivers per 100 people.

The structure of broadcasting varies from the state-owned and operated radio of many developing countries to the vast complicated network of small commercial stations in the USA. But whatever the system, the primary purpose of broadcasting stations is to attract the largest possible audience through the dissemination of information and entertainment. Naturally, the emphasis in many countries is on entertainment. However, in all countries, broadcasting is to some extent, or should be, designed to meet the best interests of the citizens,and, used responsibly, it can undoubtedly be a force for social change and progress.

Other Mass Media

The main mass media of press, radio, television and audio-visual aids although in some ways competitive are, in effect, complementary to one another. Over the whole field of communications each has advantages and special characteristics which should be exploited. Radio and television have very similar characteristics except that television is more complicated and much more costly,and, at present, much less widespread, especially in the developing countries. On the other hand, because it is a visual as well as audible medium it is a much better teaching medium than radio. Some people learn more easily through the ear, others more easily through the eye, but,in general, the impact of both together is more than double the effect of either alone.

In more developed areas, the written word both in the form of the daily press and in specialized farming periodicals is a most valuable means of communicating with farmers. Its main advantage over radio and television is its permanence. Radio and television are transitory but the written word can be read and re-read until the message is fully understood. It is particularly effective where figures and diagrams are needed to illustrate the subject matter.

Audio-visual aids are used in many developing countries quite extensively. In Madagascar, for example, there is a fleet of eighty audio visual aid vans.

The first session of the FAO Advisory Panel on Agricultural Information which met in Rome from 7-15 May 1968, stressed the importance of audio-visual aids as a means for strengthening farm broadcasting and increasing effectiveness of the programmes. The Office de Coopération Radiophonique (OCORA), a French technical assistance organization developing its activities in 17 African countries, has recently started a series of very successful experiments in this field, combining farm broadcasting with the use of educational film-strips. Radio clubs are equipped with projectors and receive film-strips which are screened at the same time as the farm programme is broadcast. This very simple and cheap technique which was called "radiovision" by its promotors, may, for many years to come, substitute for efficient rural TV in countries that cannot afford so expensive and complicated a mass communication medium.

Group Listening

This very brief review of the possibilities offered by agricultural information and mass communication media in support of development would be incomplete without a few words on group listening.

For radio programmes to make their greatest impact, it is necessary to have some sort of follow-up action. Thus, in many countries farm forums or listening clubs have been developed. In some countries, where the only receiver is a village set, listening is perforce on a communal basis. In other cases, however, communal listening is desirable because it allows for further discussion which may go beyond the stage of informing the farmer and lead to positive action. The need to stimulate action is one of the major problems facing both the extension worker and the producer of farm programmes. If programmes are to give the maximum effectiveness, listening clubs and farm forums will greatly help in this direction.

The establishment of a successful radio forum is not easy to achieve. There should be close co-operation between the radio station, the extension officer and the social and education organizers. There must be adequate listening arrangements and careful selection of chairman and members. There should be a close link between the forum and the programme producer so that reaction and programme evaluation can be assessed.

Radio is not a self-sufficient medium, but when it is coupled with group reception and discussion, and assisted by audio-visual aids, experience has shown that it can be a vital factor in creating changes in traditional farming practices and general social and economic attitudes. Farm broadcasting and audio-visual aids then become the "motivating" elements in the process of development, a human aspect which is too often neglected in the planning and implementation of aid to the developing countries.

TRAINING OF AGRICULTURAL EXTENSION OFFICERS

By GERSHON FRADKIN

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The need for increased and diversified agricultural production in developing countries is well known. This paper concerns itself with the training of village extension officers as a step towards the solution of this problem.

The training of extension officers clearly depends upon the setting in which they will work and upon the goals which it is hoped they will achieve. In the short run the extension officer is expected to effect change in agricultural practice for a limited number of crops, but in the long run the extension officer should be successful in changing the farmers' attitude towards change itself, thus preparing the ground for the over-all introduction of technological and social innovation in the rural environment. Clearly, for these changes to be effective on a permanent basis and to result in genuine improvement in the total situation, purely technical changes are not sufficient. The extension officer must try to bring about changes in the rural leadership patterns.

Accepting this view of the extension officer's role, a training programme ought to aim at the following additional broad, non-agricultural objectives:

(a) To prepare the prospective officer to be an effective link in the total process which relates the farmer and his problems on the one hand, to sources of information and problem solutions on the other.

(b) To change the attitude of the prospective extension officer toward the farmer so that he may be more effective attempting to change farmers' attitudes toward change itself.

(c) To develop the leadership qualities of the prospective extension officer so that his training activities will be more productive.

In addition to the foregoing non-agricultural objectives, the training programme for extension officers described here is based on the following relatively non-controversial assumptions:

(1) Any changes to be introduced must require the minimum expenditure of money. This means on the technological side, that only inexpensive changes in practice can be recommended for the family farm in the initial stages. On the administrative side, the extension officer must spend the maximum amount of time in the field and the minimum time in his office.

(2) Generally speaking, existing agricultural practices in developing countries are very unsatisfactory. For example, sugar beet yields in developing countries may be of the order of 4 tons or less per acre, while in a developed country the yield may be in excess of 20 tons per acre, with the same sugar percentage. Similarly, for cotton, a developing country may produce 250 kilograms per acre while the yield in a developed country may be in excess of 1,200 kilograms per acre.

(3) Despite the prevailing low standards of productive efficiency, sound agricultural knowledge and some efficient farming exist in virtually every developing country. These sources of knowledge which the extension officer may draw upon are: (a) the successful village farmer; (b) the large commercial farm or ranch; (c) the experiment station or model farm; (d) the regional expert, usually attached to the Ministry of Agriculture; (e) the foreign expert.

(4) Farmers in developing countries must see a substantial increase in their output as a result of an innovation if they are to be persuaded that it is worthwhile. Recommended changes must be simple in technique and psychologically acceptable.

Under any given conditions the extension officer must select an innovation in agricultural practice which is sound on technical grounds, not demanding of capital, requiring only small psychological adaptation on the part of the farmer and one which will make possible a significant increase in output. A simple example of such an innovation is the use of row seeding in place of broadcasting.

In order to maximize his chances of success, the extension officer should concentrate his efforts on a limited number of innovations, on a limited number of crops, and in a limited area. Only if successful does he attempt to carry these changes to a wider area, to increase the range of crops and the number of innovations.

Israel has developed a training programme for extension officers based upon the foregoing description of the setting and of the role of the extension officer. This program has its roots in an extensive period of rural settlement and extension work, during which time experienced farmers, not trained as extension officers, were used to assist the new settlers. However, in 1956, a formal programme for training extension officers was set up, drawing upon the rich experience which had accumulated over many years of agricultural development. Graduates of this training programme have supplied nearly all the demand for instructors in Israel over the last 10 years.

While Israel's programme for training extension officers from abroad, which now includes 7 years of experience and over 100 courses, necessarily had to take into account the differences in background between the Israeli extension officer-in-training and the student from abroad, the basic approach to training has remained relatively unchanged. Briefly, the programme aims to teach the student how to transfer knowledge to others, to change the trainee's attitudes toward manual labour and toward the relationships between himself and the village farmer, and to prepare the students for leadership roles. In addition to the training of Israeli and foreign village extension officers in Israel, the programme has been carried out in countries as widespread as Zambia, Mexico, Uganda, Iran and Senegal.

That portion of the programme dealing with the transfer of technical knowledge is perhaps the most easily accomplished, and it may suffice to acquaint the trainee with the five sources of information previously mentioned. Changes involving psychological factors, such as the attitude toward manual labour and social status, are clearly more difficult to bring about and require a period of apprenticeship in the field. Working alongside farmers who are also educated and cultured people helps to overcome the negative attitude toward physical effort and social distance, as does the observation that the student's Israeli instructor is not above dirtying his hands when instructing. By working in the field with a good extension officer, the trainee is able to experience the tangible changes which the instructor is able to bring about on his own initiative in a village and thus to acquire a more favourable attitude toward the role of extension officer and toward the responsibilities inherent in it.

To achieve the objectives of the programme, the training is divided into four main parts, not sequential in time, but interwoven. These are:

(a) Learning of the special problems of the family farm;

(b) Some theory to support (a);

(c) Practical work in extension - accompanying an experienced instructor on his daily routine.

(d) Preparation of a plan for the trainee in advance of his return to his own country.

In part (a) the trainee obtains a picture of the agricultural family unit as it is integrated within the whole of the village and the surrounding region. He then learns how to separate the various factors of agricultural production from one another, so that a programme of change can be initiated. He is at all times made aware that the first steps should be modest ones, using the factors easiest to change, from both the economic and psycho-social points of view.

The theory referred to in part (b) is composed of two parts - technical and psycho-social. In the latter category, the student becomes acquainted with simple sociological and psychological ideas, sufficient for him to understand basic human motivations and the problems inherent in the attempt to change individual and village behaviour. In the technical part, the trainee is introduced to material dealing with basic problems of agricultural production and special crops.

The practical work of part (c) consists of two phases, in the first of which the student lives with a family in a co-operative farming village. Here he becomes acquainted with the full range of village activities and problems, from the functioning of a local co-operative society to the relations of the village with all the agencies serving the village. It is in this phase that the trainee has first-hand experience in the role of the farmer whom he will later have to serve. In the second phase, the trainee is assigned to an experienced extension officer and accompanies him as he goes through his daily routine. In addition, the trainee studies the extension officer's weekly and monthly programme. Typically the trainee will have an opportunity to observe the extension officer working with farmers in villages in several stages of development, from fully established to raw beginners.

In part (d) the student is required to evaluate the situation in his own rural region, with a view to finding those factors which he himself will be able to change, with no great financial support and in conditions as they exist.

For example, a student returning to a cotton-growing region gave as a practical illustration his intention to recommend planting cotton in rows, followed by re-seeding for those portions of the first plantings which fail.

An example of a more advanced recommendation is the daily supply of water to dairy cattle so as to increase milk yields. (The current practice in this region is to supply water twice weekly). Non-agricultural recommendations are also made in this part of the training programme. For example, the encouragement of villagers to build a youth centre for social and educational activities, using freely available local materials, with the exception of nails which were brought from town by the instructor.

By the time the student has finished the preparation of his plan he has come to realize the importance of the correct allotment of his time, most of which should be spent out in the field working with the farmers, relatively little being spent in the office. He has also come to realise that it is far better to be responsible for a smaller area, e.g. 3 - 4 villages, rather than 30 - 40, with the opportunity to actually implement plans for improvements. He also knows how important it is to work with the local leaders of the respective villages.

A student's recommended project is presented to the trainees and staff for evaluation in the light of the basic assumptions upon which the training programme is based and upon an appraisal of his local situation. The basic points of analysis are:

Are the proposed changes simple?

Are the proposed changes feasible?

Are the proposed changes inexpensive?

Do the proposed changes represent a modest start?

Do the proposed changes lead to significant improvements in income?

Beyond the basic points outlined, the evaluation of the recommended project includes an analysis of the implementation of the project by means of a detailed work plan for the trainee. This work plan should include details of the implementation on a weekly, monthly, and yearly basis.

In conclusion, it cannot be emphasised too strongly that even the best possible training programme for village extension officers will not be effective at the village level if proper support from higher policy makers is lacking. The agricultural complex, consisting of farm youth, farmers and their wives, extension officers, regional directors, and staff on the national level, may be compared to a chain which is no stronger than its weakest link. When lines of communication are open, it becomes possible to obtain the teamwork and co-operation so vitally necessary for the struggle to improve living standards in the rural community.

AGRICULTURE IN KENYA SECONDARY SCHOOLS

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Much has been written about the importance of training in agriculture for the developing countries, the various obstacles that are to be encountered in initiating such programmes, and description of the end-product desired. Too often these reports are very general in nature, somewhat dogmatic in approach, and leave the reader overwhelmed by the magnitude of the problems to be faced.

This account of a programme of agriculture in the secondary schools of one country, Kenya, is neither intended to provide any general guidelines nor to develop an educational philosophy that might be adapted to another location. It represents what we call here a 'Harambee' effort and hope that it will indicate to the reader the sense of urgency with which the government of Kenya is facing the general problem of education for agricultural development.

Introduction

Kenya has nearly 3/4 of the population of 10 million directly involved in agriculture. Agriculture contributes more than three times the share of any other sector of the economy to the Gross Domestic Product. Nearly all students arriving at secondary school have had first-hand experience of local agriculture. The Education Ministry takes the largest single portion of the national budget and is expanding educational opportunities at an unprecedented rate. Strenuous efforts are being made to diversify the secondary school curriculum, including the introduction of agriculture.

Background Information

The subject of Agriculture was first introduced into the Kenya secondary school curriculum in 1960. The Chavakali Secondary School in Western Province was selected as a site for an experimental programme. Foreign aid funds were available for this experiment and an agricultural workshop complete with tools and agricultural equipment was built at the school. An instructor was also employed under the agreement.

The Chavakali experiment was unique in several ways. First, this school was from the very start a 'community school'. Through the vigorous efforts of the local Chief, the boundaries of the area the school was to serve were determined by the willingness of the local people to contribute to its development. The boundary lines were finally drawn and each of the families within this catchment area contributed a sum of Shs.50 ($6) toward the building programme. This 'Harambee' effort engendered a strong feeling of belonging to the school - and vice-versa - which proved to be invaluable in the later development of the agricultural programme at the school. The selection of students for the school was restricted to the tax-paying area and the local people appreciated the feeling that this school really served their community. Favourable working relationships between staff and community were easily developed in this setting, and community leadership took its proper role in the development of the school.

Secondly, the school operated at the beginning as a true day school. Students walked or rode their family bicycles into the school each day, returning to their homes each evening. The daily trip to and from school (in a few cases as much as 24 miles for the round trip) required not only a great deal of time but physical stamina - and the amount of mental stamina required was no less, as the students crossed the threshold from traditional to modern life and back again each day. The pioneer students at Chavakali were able to shoulder these heavy burdens and today they take pride in their achievement under what were certainly difficult circumstances.

Thirdly, another, possibly unique, feature about the experiment was the actual siting of the school. Some responsible people claim that the location is in fact the population centre of the whole continent of Africa; it is certainly a very heavily populated area. The average size of shamba or smallholding is indeed small, and the standard of agriculture of the area was very, very low. All these features were, however, an advantage when the time came to search for indications of the success of the teaching of agriculture at the school, because any small improvement was often replicated many times within a small area.

Fourthly, the other unique feature of the Chavakali experiment involves 'vested interests'. The imported academic curriculum of the Cambridge system had built up a few such interests, and some expatriate science advisers in the Ministry of Education had to be persuaded to accept this new idea. There was, fortunately, no competing agricultural programme which had to be altered, substituted for or adapted to the secondary system. There were no strict guidelines or lengthy government circulars to direct the efforts that were to be made in the programme. From the beginning, the Ministry of Agriculture gave its full support and interest. Innovation was the keynote of the Chavakali experiment.

Many other factors bore on the Chavakali experiment - which certainly were not unique. There was community and student resistance to the introduction of Agriculture into the school timetable at first, and a certain amount of education was required to overcome this natural response to the addition of practical subjects in what had been a purely academic education. There was lack of finance for the recurrent and capital costs at the school, normal problems in obtaining suitable teaching materials for Agriculture and the lack of any accepted syllabus for the course. Students and education officials alike had come to think of a syllabus as being a pre-requisite for any type of instruction in a school but in an experimental situation this was not the case. Based on the first 18 months' experience, a syllabus was drawn up, approved by both Education and Agriculture Ministry officials, and provisionally approved by Cambridge in December, 1962. Of the pioneer students from Chavakali who sat for the 'Agriculture Principles and Practices' examination in November, 1963, 87 per cent passed - after only three years of instruction.

As day pupils the students were encouraged to develop plots at their homes as a demonstration project and to apply in small ways the principles and practices they were learning at school. This was also an attempt to indicate to parents and the community the practical value of the Agriculture course.

A Young Farmers' Club was organized at the school to widen the agricultural interests of the students in the course. At that time, the Young Farmers' movement in the country was mainly composed of European boys and girls in secondary schools, and the Chavakali Club managed to gain recognition in the movement as the first up-country African club. Field trips were organised for the students in the agriculture course in an attempt to broaden their outlook on agriculture and to bring them into contact with organized agriculture in other sections of the country. During school holidays efforts were made to place selected students on large scale farms for practical experience and informal training with the farm managers.

These efforts stimulated greater interest. First, the official approval to include agriculture as a School Certificate subject; second, close co-operation of school officials with the surrounding community gradually overcame the doubts and suspicions of parents; and third, the home projects were demonstrating to parents that the principles being taught at school did bear relation to home conditions and the improvement of agricultural production on their small farms. A quick trip around the location today will serve as the evidence that a secondary school can relate its educational activities to the community it serves.

The problems of introducing agriculture into the educational system at Chavakali were not agricultural in nature - they were educational. They were people problems; how to work with people of different educational standards, how to present new ideas that conflicted with ingrained and accepted traditions, how to re-orient student and parental aspirations to the realities of the day, how to paint a new and fuller picture of the role of education in nation-building.

The Present Program

Shortly after Independence in December, 1963, the Kenya Government initiated a fairly intensive evaluation of the Chavakali Experiment. Officials investigated the day-to-day teaching program at the school, talked with elders and community leaders and interviewed students. The results of this investigation gave rise to an expansion of the program, and Agriculture was introduced into a further six secondary schools in 1964-65 with the idea that these would all serve as demonstration schools. In 1967, the Education Ministry announced a policy of extending the teaching of Agriculture as a regular subject into all the rural secondary schools as quickly as possible. Obviously, the two major limitations to the pursuit of this policy are finance and teaching staff. Agriculture is regarded as pre-vocational education by the Ministry of Education. It is thought to be a most valuable addition to the general education of all students. There is as little intention to produce a finished agricultural technician as there is to produce a finished mathematician or geographer, but the importance of agriculture to Kenya makes it imperative that students develop an appreciation for its central role in nation-building, that they learn certain general skills and develop an understanding of the problem-solving approach and of the economic incentives that are necessary for agricultural development.

Syllabus

The syllabus entitled 'Agricultural Principles and Practices' was approved by the Cambridge Syndicate for use at the Chavakali Secondary School in 1962. This syllabus has now been approved for use in all Kenya secondary schools. It is a general agricultural syllabus and is divided into four main sections; crops and soils, animal husbandry, farm management and economics, and agricultural mechanics. It has remained unchanged during the past five year period and serious thought is now being given to its revision. The syllabus has been approved as one of the '0' level subjects for University of East Africa entrance. (Copies are available from the Kenya Ministry of Education or the Agricultural Education Branch, FAO, Rome. A detailed Scheme of Work is also available.)

Examinations

The responsibilities for administration of the secondary examination system is now in the process of being transferred from the Cambridge Syndicate to an East African Examinations Council. From 1963 the Kenyan Ministry of Education has been responsible for the practical examination in this subject with the theory paper coming from Cambridge and being returned for marking. Beginning in 1968, Kenya will set and mark both the theory and the practical parts of the examination, and agriculture will be the first paper to be taken over by the new East African Examinations Council. A file of five past examination papers is now available.

Timetable

The average timetable in secondary schools is about 40 periods per week of 45 - 50 minutes in length. Typically, about 5 periods per week of instruction is given in Agriculture. This must include both theoretical and practical instruction and many instructors are hard-pressed to cover the syllabus. Many times after school, or Saturday morning, practicals are conducted, and the students in the course are actively involved in the operation of the school farm, as well as their own or group projects connected with the instruction. The newer schools which are being added these days are only partly boarding schools and at least half of the student body are day pupils. These students can be actively engaged in projects at their home in their own time.

School Farms

Each school where Agriculture is offered is required to provide a demonstration farm of at least five acres. This often required negotiations with community leaders and local government officials, and in many cases a very much larger area has been set aside. The five acre minimum will allow all the students to be involved in educational project work, while a larger area will possibly permit some commercial activity. The primary concern here is participation and the creation of a learning experience as opposed to a money-raising operation. In several instances the proceeds from the school farm have been a valuable addition to the school budget, but the main objective is teaching, not profit-making. In the newer day school, emphasis will be put upon home projects to the greatest extent possible, but boarding schools will continue to be involved in individual and group projects on the school farms. Often these projects are run in conjunction with the Young Farmers' Club programme of work and they usually fit together nicely. Normally the project activities are in the crops area but an increasing emphasis is being placed on livestock projects, particularly poultry and dairy cattle. In boarding schools, livestock projects present some difficulties during the school holidays, but arrangements can be made with school staff to overcome them. In nearly all cases, the heads of schools welcome an opportunity to purchase the proceeds of the projects, as they need nearly all types of food, including eggs and milk for use in the school kitchen. This sort of arrangement also provides for a diversification of diet that was not previously available at most schools as well as student opportunity for crop storage, marketing and record keeping.

Classroom/Workshop Facilities and Equipment

A well-equipped classroom/workshop is regarded as necessary for a successful teaching programme in any school. The average facility is a structure with about 2,000 sq. ft. under roof, and the possibility of extensions being made by the local school if necessary. Equipment includes the normal hand tools for basic shop work in each of the areas of woodworking, plumbing, welding, metal work and tractor maintenance for groups of 5 - 10 students. Since the average class size is 35 students, there should be sufficient hand tools to keep several types of activities going at once. Obviously it is too expensive to equip a school with 35 sets of hand tools for each of these skills, but all are important and the ingenuity of the instructor in teaching these skills is demanded. A small field size tractor and a few related implements are supplied to each school and tractor operation and maintenance is an important part of the instruction. Soil sampling and testing equipment is standard as well as the basic animal husbandry equipment. Naturally, in time some of the schools will develop special programmes relating to the agricultural problems of their areas and the equipment needs will vary. Much of this relates to the future revision of the syllabus and the changes in instruction programmes that such revision will entail.

Teaching Materials and Equipment

Nearly all the secondary schools already have their own 16 mm. ciné projector when the agriculture program is introduced. In addition to this, a 35 mm. slide projector should be available for general use. Many ciné and slide films are available which are valuable teaching aids. A great effort has gone into providing each project school with an assortment of general reference books. Where feasible, textbooks have been purchased - on farm mechanics, livestock and poultry production, soil science, etc. Our experience has been that such textbooks are usually of limited use since the majority have been written by outsiders and printed overseas which makes them very expensive. An Agriculture Section has now been formed in the Curriculum Development and Research Centre of the Ministry of Education and the collection and printing of local materials will be one of the main responsibilities of this section. Within the coming year it is hoped that a general agriculture textbook, applicable to all of East Africa, will be off the presses and available for use in secondary schools at an acceptable price. At the present time, this text is in mimeographed form.

Inspectorate Activities - Supervision

During the initial phases of the agricultural program the inspection of schools and the supervision and assistance of agriculture teachers has been left largely to the project leader. The Ministry of Education has now increased the establishment of the Inspectorate so that an Inspector of Schools for Agriculture can be employed. His responsibilities will be as a member of the school inspection team when such a school is teaching Agriculture. He will work in conjunction with the Agriculture Section of the Curriculum Development and Research Centre in organising in-service training, and conducting related research, and general supervision of the teachers on the job.

Teacher Training

Egerton College is a diploma granting agricultural college in central Kenya and this institution has been chosen for the training of secondary level agriculture teachers. Beginning in 1968, a new curriculum, Agricultural Education, was initiated and the Ministry of Education is sponsoring 50 students in the program.

A fully qualified agricultural educationist is now in charge of the new Education and Extension Department and another is scheduled for next year. They will both have local counterparts working with them when the new curriculum is in full swing.

The Egerton program is similar in length to the program being required for other students in secondary teacher training colleges. In addition to their professional agricultural work during the regular terms at Egerton, special courses in professional education will be offered during the long vacations of the college and during their final year they will be expected to fulfil the requirements of teaching practice. This program has been a joint exercise of the Kenya Institute of Education which determines the entry requirements for secondary teachers, the Ministries of Education and Agriculture, and Kenyatta College which is the main teacher training college for secondary teachers in Kenya. All are contributing their resources and knowledge to make this mutual undertaking succeed. The Ministry of Education has sponsored students at Egerton College since 1963, but this year marks the first full-blown effort to produce a finished teacher at the end of the normal 3-year course. Present plans indicate that the sponsored students at Egerton will receive their agriculture diploma and teaching certificate simultaneously upon successful completion of this new course at Egerton College. In the recent past, special in-service courses have been conducted for Egerton diplomates in order to qualify them for teaching certificates.

Ministry of Education policy is to have 50 per cent of the staff in secondary schools of degree training as rapidly as possible. This is a goal not easily achieved, particularly in the Agriculture teaching field. There are great demands for personnel of this high-level training and it is difficult to attract them into teaching, even if they have teaching certificates or diplomas in education. Three of the agriculture teachers have gone overseas for degree level training in Agricultural Education. More are selected to go this year, but in the long run, is is hoped to be able to do degree level training in Agricultural Education at the new Faculty of Agriculture in Nairobi, or at least degree-level training in Agriculture with an education option, as is now being done for both arts and sciences students in the University College Nairobi.

The prestige of the Agriculture teachers among his colleagues and students is often a serious problem. With the teacher training programme at Egerton, and with hopes for similar facilities at degree level within the country, it appears that we shall not have to face this problem. The standard of training offered at both these institutions should place the Agriculture teacher on an equal if not higher footing than his colleagues in the schools.

Upon completion of the Egerton training programme, these teachers will be employed by the Kenya Teachers' Service Commission. This Commission is the single employer of all teachers in the country, and they will post the teachers to the schools where they are required. The recent Salaries Review Commission has made changes in the teacher salary scales so that these teachers will enter the teaching ranks at the same salary they might have received from the Public Service Commission if they had taken civil service appointments as Assistant Agricultural Officers in the field services of the Ministry of Agriculture. This alleviates the problem which often occurs when there is a vast difference in salaries received by men of equal training but different assignments.

Youth Clubs

The formation of a Young Farmers' Club in each of the schools where agriculture is offered has been considered an absolute necessity. The activities of these clubs vary in detail, but generally include individual plots where students have the use of a piece of ground during the year, retaining the profits of the produce;

training for and participation in livestock, poultry, and farm and dairy produce competitions; and leadership activities and public speaking. On a regional and national scale there are annual camps, rallies for instruction and competitions, several tractor driving contests during the year, an essay contest and a variety of other activities that encourage and provide incentives for participation. The country Young Farmers' movement is served by an executive secretary, a National YFC committee and ten district committees.

The Young Farmers' Club is an ideal partner for more formal instruction during classroom lectures and practicals. It encourages student participation and development and offers a chance for students to travel and see other parts of the country and its agriculture.

In-Service Training

The Kenya school year operates on a calendar year basis, with each year broken into three terms of approximately 13 weeks in length. It has been the policy of the Ministry of Education to encourage a one or two-week session of in-service training for all teachers of Agriculture between each of the school terms throughout the year. Many times topics are chosen by the teachers themselves in the areas of the teaching work in which they feel poorly prepared. Some travel and visitation is done each session, helping the new teachers to get a feel for the country and to study the great variety of flora and fauna which are found here. Present plans are to continue this policy in the foreseeable future.

Finance

The capital costs of the pilot project and the demonstration schools were obtained from technical assistance donors. The capital costs of the present and planned expansion are included in regular government estimates. From the beginning the recurrent costs have been made a part of the regular budget estimates for the school involved. Planning for, and administration of, the funds required for the agricultural course is a part of regular Ministry procedures.

As any teacher or administrator with experience knows, the introduction of a practical subject into a school requires finance, both recurrent and non-recurrent, and Agriculture is no exception. The Ministry of Education is aware of this requirement and channels for requesting and receiving necessary finance are open.

Problems

While this topic should not be the centre of focus, neither should it be overlooked. The dialogue between academics and agriculturists continues as to the proper age to offer vocational training in agriculture to the young people of a country. The philosophy of an educational system and the needs which it must fulfil must be given consideration in answering this question, and a hard look must be taken at the truly vocational training institutions that are available for the job. The role of the Ministry of Education in introducing educational reform into the curriculum so that the total education process can produce the type of manpower required for the nation-building process must be closely examined.

Then there is the problem of semantics - regarding the very use of the word vocational in connection with agriculture. The assignment of a name to an agricultural course in schools begins to raise eyebrows. Many people would prefer to see the term agricultural science, or rural science, or agricultural biology.

We chose the name for the syllabus because we felt it actually described the content of the course. It is definitely pre-vocational, and in the case of the majority of students for whom secondary school is terminal education, it is as near vocational training as Kenya can offer. The use of existing syllabuses in agricultural science or agricultural biology would be doomed to failure unless specially recruited teachers were available to teach the subject and their abilities less than fully utilised if the syllabus were to have been followed. The obvious answer to this dilemma seemed to be a new course, a new teacher training programme, and hopefully a new end-product.

Educational reform is difficult at best. Officials whose responsibilities include this task are usually trained in the system they intend to change. Others whose positions are secure if the system remains static become insecure in the evolving system. Public opinion as well as official government policy has helped tremendously in overcoming this obstacle to the effective introduction of Agriculture in schools.

The value of home projects was shown in the experiment at Chavakali. The second phase of this project included six schools, all of which were boarding schools. This involved some problems with the effective participation of students in some educational project along agricultural lines. The swing back to day schools in the recent expansion of the secondary system now brings back the possibility of capitalising on this closer connection of school and home improvement.

A major criticism with which we have had to contend is that of excessive cost of the programme, particularly from outside visitors and experts. Many such observers have failed to note the true cost of the introduction of such subjects as the pure sciences (physics, chemistry, biology) - buildings and equipment and recurrent costs. These critics are making the same observations regarding the costs involved in establishing technical programmes in secondary schools as well as industrial arts. Fortunately, advisers from the World Bank who have visited the country from time to time to supervise the utilisation of World Bank loan funds have taken the opposite and encouraging view that as many as possible of the known pre-requisites for a program's success should be provided from the start. They have made a very substantial estimate for the building and equipment needs and this augurs well for the future of the programme.

The reputation that was allowed to develop during colonial days regarding agriculture as an occupation of the unfortunate, uneducated, and unskilled was deplorable. Fortunately many of those educated during this period have done an about-face and it is not uncommon to find the intellectuals of the 'city' on their farms during the week-ends. It is probably fair to say that the majority of Kenya urban dwellers either own or control agricultural resources, and the ownership of land is the major type of social security for those over the retirement age in the society. It is common knowledge among young people that farming is both an honourable and profitable occupation, and there is a very active interest among both secondary level students and administrators in the secondary school programme.

The examination tends to be an over-riding influence in the system. In the past, the possession of the examination certificate probably guaranteed the student that he could find employment. With the changing nature of the employment market, this is no longer the case. A rapidly increasing output of Form IV school leavers still regard this certificate as the major goal of their education. It remains indispensable for university entrance, but has lost much of the rest of its magic and yet without some sort of examination, the prestige of the subject is dimmed.

This is an obstacle which only time and evolution of the education system can overcome. In the interim we are trying to keep this examination geared to local needs, set and administered by a local group, and tied to local conditions.

Not the least of the obstacles which must be overcome to assure that the agricultural course makes a useful contribution is that of adapting the course content to local conditions, problems and agricultural practices. Within the country, farming is practised from sea level right up to 10,000 ft. altitude. The farming patterns as well as ecological and social conditions vary tremendously. All of the other subjects in secondary schools are offered from a standard syllabus; obviously this cannot be the case for an effective agricultural offering. The development of syllabus options is now under way. Ranching and grassland improvement; a girls' option including food processing, human nutrition and small animal production with emphasis on poultry; and the farm mechanics option should help meet this problem effectively. The concomitant problem of collecting and preparing teaching materials along these lines should be progressively solved by the work of the Agriculture Section in Curriculum Development and Research Centre.

Summary

The preceding paragraphs represent a short report on the status of agriculture as a subject in Kenya secondary schools. Agriculture has been offered as an optional course. The response from students has been very positive. Many factors are influencing student choice: public utterances of many leading citizens and politicians, the novelty of a new course in their schools, the changing nature of employment opportunities, the attraction of things mechanical, the traditional values placed upon land and its use, and the enthusiastic approach of the teachers regarding agriculture as an honourable and rewarding occupation. The original experiment at Chavakali was considered to be successful. The schools selected to initiate agriculture in 1964 have demonstrated further merit in this type of education. The policy of the Kenya Ministry of Education is to introduce the teaching of Agriculture into all the rural secondary schools as quickly as possible. Present plans indicate that Agriculture will be taught in at least 21 secondary schools by 1969 with well over 5,000 students involved in the program.

'Harambee', Kenya's national motto, is a Kiswahili word which means pulling and working together. The successful introduction of agriculture into secondary schools has been a Harambee effort. Tribute goes to the officials in the Ministry of Education, the Ministry of Agriculture, Egerton College, Kenyatta College and Kenya Institute of Education for their mutual efforts with the field officers, the technical assistance donors and the teachers themselves.

THE NEED FOR AGRICULTURAL MANPOWER PLANNING

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Why manpower planning in Agriculture?

1. From concentrating primarily on means of rapid industrialization, there has been a swing in recent years towards stressing agricultural development in the plans and programs of the developing countries. This increased attention to agriculture takes many forms and varies widely in its comprehensiveness, but the techniques of agricultural development planning have rarely attained the degree of sophistication of those used in industrial planning. This is particularly true of manpower planning in agriculture, which so far has been a largely neglected field.

2. Even more so than for industrial development, governments must provide the initiative for beginning and continuing the agricultural development process. Governments have to provide the technical and other services which stimulate and encourage the desired changes. The personnel in these services are, in effect, what has been described as the prime movers of change, the shapers of development itself. What cannot be assumed by those responsible for rural development planning and especially by those responsible for implementing such programs, is that the supply of trained and experienced personnel will automatically be there when required. Indeed, the opposite is true. The requisite numbers and kinds of professional and technical people must be provided for deliberately in all development plans.

3. This requires a carefully rationalized and realistic agricultural development plan in which provision is made for the kinds and numbers of trained manpower required and for their phasing into programmes as they are implemented. In other words, there must be a close dovetailing between the output of the agricultural education system and the implementation of the programs that require these personnel.

Why manpower planning by FAO?

4. The overall field of manpower planning and vocational training has always been accepted as the prerogative of the International Labour Organization (ILO). However, they have been the first to recognise that the methods of manpower planning evolved for use in the industrial sectors of the economy are almost wholly inapplicable to the agricultural sector. This applies particularly to the form of manpower planning being attempted in FAO, and which, so far, is confined to the professional and technical categories of trained personnel.

5. There is, therefore, no duplication of the valuable work of ILO; on the contrary, an important gap is being filled. What little has been done so far in the course of the FAO Indicative World Plan studies and elsewhere, has already been recognised by the ILO and others. Fruitful working relationships have been established with ILO and with UNESCO, including the International Institute of Educational Planning. FAO is actively co-operating with the ILO in the agricultural aspects of their "Ottawa Plan" for Regional Employment for Latin America and the Caribbean, and in their Asian Manpower Plan. Assistance is also being given to the UN Economic Commission for Africa, in their Working Party on Manpower and Training. In view of the predominant position of agriculture in the economy of almost every developing country, and the large proportion of their populations

dependent on agriculture for their livelihood, the importance of the contribution FAO can make to such joint activities in human resources development is evident.

6. There are several good reasons for this. FAO is the only UN agency with first-hand knowledge and experience of the many facets of agricultural development and of the variety of specialized fields in which trained personnel are required. Only FAO has (or is in the best position to obtain) the facts and knowledge necessary to make even approximate assessments of the numbers and quality of trained personnel required in agriculture generally and for specific programmes and projects of agricultural development. Manpower planning for the professional and technical categories is an essential and natural corollary to what is already being done in FAO, particularly within the Rural Institutions and Services Division, in the fields of agricultural education planning, extension programs, land settlement, credit and co-operative services, the organization of agricultural research and in agricultural administration. Incidentally, this specialized type of manpower planning should not be confused with the more general form of planning concerned with the total agricultural labour force, in the agricultural sector of the economy, nor with the more detailed questions of labour productivity and inputs at the farm level.

7. Further, many of the developing countries are making or planning considerable investments in agricultural education, for which UNDP, IBRD or other forms of international finance are being sought through FAO. It would seem both logical and essential that FAO should continue to develop the necessary competence in the manpower planning and personnel development field (i) to constantly improve the validity and accuracy of our assessments of such projects and requests, and (ii) to be able to service requests for work in this area from member countries. The nature of the work involved is discussed below.

8. Another pressing reason for FAO undertaking systematic and regular work in the agricultural manpower planning field, is the number of misconceptions which are prevalent at the present time in otherwise informed circles. This is evidenced principally by the widespread attempts by economists and others to apply industrial techniques of determining manpower requirements and forecasting to the agricultural sector as a whole or in part; and secondly, by attempting to assess single agricultural education projects, for example, on a cost-benefit approach. It is not enough that we should be convinced that these methods are not wholly accurate or applicable to the agricultural situation, especially in the developing countries; the onus is on us to demonstrate this fact and indicate alternative and more appropriate methods of assessment.

The scope for manpower planning within FAO

9. The desirable objective in this work is to develop it to the point at which FAO can compile with any member country, a complete inventory or balance sheet of its overall requirements in trained agricultural manpower. Such a study would cover the needs of the agricultural services as such, those of the forestry, fishery, food processing and marketing industries, where relevant, and also the education and training system necessary to provide and maintain the estimated manpower requirements.

10. This work entails three things: (i) establishment within FAO of the requisite professional competence in the specialized fields of manpower planning and development; (ii) liaison and exchange of information and experience with the other principal UN Agencies involved; ILO for overall manpower planning, UNESCO for

general educational planning and possibly the United Nations itself, for general planning; (iii) a series of investigational studies and training programmes with member countries, on the uses, scope and methods of manpower planning in the agricultural field.

11. Only when sufficient trained people are engaged on this work in individual countries will there be the necessary transfer and exchange of knowledge and information. Only then will the full objective of this work be realised - the better development and utilization of human resources in agriculture.

The nature of agricultural manpower planning

(a) The search for a methodology

12. Earlier it was stated that the methods of manpower planning evolved for use in the industrial sectors of the economy are almost completely inapplicable to the agricultural sector. This statement requires qualification. In the forestry industry, for example, the projected output of timber products can be related to capital investment and area of growing forest. To these in turn, certain recognised norms of labour per unit of capital and per unit forest area, can be applied, to translate output and capital investment into manpower requirement. The same can be done with a modern fishing industry and with food processing industries. Some useful papers on this subject have been produced by both the Department of Fisheries and the Forestry and Forest Products Division of FAO.1/ 2/

13. In the light of experience gained over many years, industrial-type techniques can also be applied appropriately to the plantation system of agricultural production. But there the similarity stops. For the traditional and largely subsistence types of agriculture predominant in most developing countries, the "unit of production" is less that of the tiny fragmented farm than the farmer himself or more accurately, the farmer and his family. (In most tropical environments, the "farm" literally disappears into bush or desert in a matter of months if left unattended.)

14. This concept of the dominance of the human factor in agricultural production, is an important and fundamental distinction which, if accepted, immediately crystallizes the point on which we have to concentrate our attention. It also simplifies one major problem of manpower planning, namely, the basis on which to assess requirements of trained personnel for the agricultural services. This then becomes primarily a function of the number of agricultural families, the type and relative intensity of the farming practised, the nature and extent of the changes to be effected in the agricultural system, the structure of the rural community and the model of field service administration to be employed. This in turn provides the basis upon which the agricultural education and training system can be assessed and any changes planned.

15. In this latter connection, agriculture again differs from many other industries. In the first place, practically the only significant demand for trained personnel in the developing countries, in the early years of development, comes from the government and related services. Further, within these services, there is a very close relationship between occupation and training, which is not true to the same extent in industrial countries. This simplifies the problem considerably. On the other hand, the training of farmers and of farm workers, as such, is an entirely different problem, where other considerations and criteria apply, but it would not be appropriate to go into these here.

16. The preceding paragraphs contain the essence of the approach and methodology developed by the writer in his Nigerian studies3/ and modified in the current IWP studies. In the circumstances peculiar to agriculture in developing countries, and in the present state of knowledge of these matters, such a method is the only feasible and logical approach to the problems involved. Obviously this is only the beginning. The search must continue to improve the methodology now in use, and so find better ways of serving member countries' demands for the assessment of their manpower needs in all fields - including for example, agricultural research and the many other supporting services to agriculture, both in the public and private sectors.

17. The nature of the systematic work involved in professional and technical agricultural manpower planning is discussed in the following section.

(b) Systematic work involved in agricultural manpower planning studies

18. The systematic work involved in carrying out manpower planning studies in this field may be summarised as follows:-

(i) Research and investigational case studies into the existing situation in a selected number of member countries, together with the regular and systematic collection of data for others, with regard to:

- the agricultural population: numbers, structure, resources, educational levels; farm family size and distribution; work distribution practices.
- existing resources of trained agricultural personnel: numbers, distribution, educational and training levels by occupation and subject-matter; wastage rates, salary scales, conditions of service, incentives, etc.
- organization of agricultural and related services within each country; pattern, functions and responsibilities; staffing numbers and profiles (staffing patterns); existing development plans, etc.
- recurrent expenditure budgets of all government ministries and related bodies concerned with agriculture, with particular reference to costs of agricultural services, personnel and operating costs.
- agricultural education and training resources and programs; levels, subject-matter areas, courses - formal, pre-service, in-service, etc.; student capacities, enrolments, drop-out rates, graduate numbers.
- costs of different types and levels of agricultural education and training; recurrent and capital expenditures, per student, per graduate, etc.

(ii) Collation, tabulation, analysis and presentation of the material gathered; use of these data as a basis for assessing and estimating present and future requirements of trained agricultural manpower, both in quantitative and qualitative terms, and wherever possible with comparative costs; determining implications of these requirements on the agricultural education system, in terms of annual intakes/outputs, qualitative standards, etc.

(iii) In the course of this work, to pursue the progressive development of appropriate methodologies in the field of manpower planning for food and agriculture, and to frame suitable financial and other criteria for the assessment of programs and projects in this field in order to service the needs of member countries.

19. In conclusion, it can be said that the foregoing is a summary of the work being attempted in a limited way, in connection with the Indicative World Plan studies. Much of the data needed are, of course, either inadequate or not available, and lack of time and resources prevent a more thorough search being made. There is a strong case, therefore, for the collection of country manpower and training data being handled in a regular and standardized manner, such as is done with data on commodities and other matters gathered by FAO. Further, to reach acceptable levels of continuity and standards of professional competence, the work itself needs to be put on a more systematic and long-term basis.

20. Looking further ahead, FAO will doubtless be expected to play its full part in assisting member countries to achieve successful implementation of their plans for agricultural and human resources development. This work will make ever more exacting demands of the FAO staff involved, and in the field of agricultural administration and development, will almost certainly be based on the techniques of systems analysis. This involves a study of the total services and functions to be carried out in the agricultural sector, determining the most appropriate vehicle to provide each service or function, whether by government, quasi-government bodies, farmers' organizations, commercial or private enterprise, and devising the most effective systems through which these various agents of change can operate. Manpower planning and personnel development will be an essential part of this process.

21. It will be seen that professional and technical agricultural manpower planning is not concerned solely with estimating numerical requirements. It is equally concerned with the existing resources of trained personnel, by numbers, occupations, levels and fields of training, with the movements of personnel into and out of the different services, public and private, and with the factors influencing such movements; for example, status, incentives, comparative career opportunities, salary scales, etc. It is concerned also, with the training facilities and methods in use, both formal and in-service, as well as with the costs of training at the different levels, and the costs of operating the various agricultural services. In other words, it is concerned with the overall planning, development and utilization of professional and technical manpower in agriculture.

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DEVELOPMENT OF AGRICULTURAL ENGINEERING PROGRAMMES WITHIN SCHOOLS OF AGRICULTURE IN LATIN AMERICA

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Agricultural engineering, as developed during the last 50 years in the United States, is now a profession in which the mathematical, physical, analytical sciences and graphics are applied to agriculture to promote agricultural development, taking into account the biological factors of the rural environment.

Thus, the agricultural engineer is, first of all, an engineer possessing a good grounding in the exact sciences; and in this respect he is no different from mechanical or civil engineers.

However, early in his professional training the agricultural engineer is given an orientation toward agriculture; and later, he will concentrate on a particular sector - farm mechanization, agricultural machinery, soil and water engineering, processing and preservation of agricultural products, or rural construction.

It is this specialization that distinguishes the professional agricultural engineer from the agriculturist, who, although he may have been instructed in agricultural engineering practices, is not concerned with how such practices are planned, developed, or adapted to the environment.

The agriculturist promotes the application of modern methods in agriculture. The agricultural engineer, on the other hand, is also expected to make technical advances; he will be put in charge of research in the different fields of agricultural engineering, will initiate and adapt technical methods to the local agricultural conditions, and will finally provide producers and general agriculturists with the means of applying these methods.

In order to train such professionals, a section of Latin American students should be given information and skills enabling them to contribute to the solution of the many engineering problems involved in modern agriculture. Effective agricultural development is closely bound up with the training of professional teams possessing a sound education and a sufficiently high level of specialized training.

Although the concept of higher agricultural education based on specialization has been applied successfully in some parts of the world, it is still very unusual in Latin America where the tradition of a general education in agriculture with some knowledge of related fields still persists.

THE ROLE OF AGRICULTURAL ENGINEERING IN MODERN AGRICULTURAL DEVELOPMENT

Agricultural engineering has played an important role in the rural development of the countries which are already industrialized; and it is becoming clearer every day that in Latin America this branch of engineering can also make a valuable contribution, provided it is applied to local conditions and in equilibrium with other aspects of development.

Most Latin American countries have already undertaken development programmes involving agricultural engineering, in the reclamation of new farmland through clearing and earthmoving, in irrigation works, in the introduction of machinery and physical plant, and in new methods which facilitate farmers' work and increase productivity. Their economies have now reached the stage of development at which they will depend increasingly on professional agricultural engineers.

In the first place, there is a growing need to use engineering techniques to increase the productivity of farm labour, which with rapid urbanization is becoming a progressively smaller proportion of the total national population. During the past 20 years, in many countries, the same number of farmers has had to produce a much larger quantity of food and agricultural raw materials to meet the needs of the growing urban population.

In the second place, the agricultural engineer must make the new techniques, machinery and installations available to farmers who have never experienced the technological environment to which those in more developed countries have been exposed. This requires specialists capable of solving problems in land and water use, processing of farm products and also instructing farmers in new techniques.

(1) Irrigation programmes

One of the many technological problems in Latin America is the successful execution of irrigation programmes. Irrigation works with direct offtake systems, storage reservoirs, diversion dams, wells and pumps call for the participation of agricultural engineers. Irrigation schemes require a basic, sound knowledge of hydrology, fluid mechanics, agricultural hydraulics and drainage.

Many irrigation projects in Latin America have not been as successful as was hoped because they were planned and carried out according to the criteria of civil engineering and did not take sufficiently into account their agricultural purposes. For example, due to incorrect use of water and improper drainage many good lands, on being irrigated, have turned saline. Urgent drainage and reclamation measures must be instituted if these lands are not to lose their productivity for ever.

Such measures alone will still not solve the whole problem. After the construction of good irrigation systems, there comes the task of systematization and implementation of irrigation so that optimum use is made of the water through application of engineering techniques. This task is beyond the agriculturists' training, and far removed from that of the civil engineer. It must necessarily be handled by the specialist in combined fields - the agricultural engineer - if failures are to be avoided.

(2) Conservation of natural resources

The climate and topography of many Latin American countries makes the soil highly susceptible to erosion. This is caused by wind in coastal areas, by incorrect land-use and by hilly topography and heavy rains and is undermining productivity. Much farmland remains idle because of the lack of an appropriate technical method of soil protection. In addition, drainage is essential so that large areas of arable land do not remain unused.

A careful investigation is required of the various factors involved in erosion - precipitation, soil, and land-use which permits the application of suitable control measures. Solution of these problems is to a great extent the responsibility of agricultural engineers as such. Soil protection is frequently a problem of engineering as applied to agriculture.

(3) Agricultural Machinery

Agricultural machinery of various kinds is essential for programmes for land reform and also for development of the increasingly important agricultural and livestock cooperatives. Yet, there is no body of engineers specialized in agricultural machinery and mechanics for maintenance of such machinery. Nor do we have designers for the machinery, implements and equipment required for production and handling of specific crops in certain areas. The farm mechanization policy of the developing countries must take into account the particular conditions in each, especially the characteristics of their natural resources and their use of manpower.

There is no question that the correct use of machinery means intensification of farming, higher yields, better use and conservation of soils, and the acceleration of technological progress in agriculture in general. When the growing season is short, larger areas can be prepared, sown and cultivated in less time. In addition many operations are more successfully performed with mechanized equipment than with animal power or manual labour alone. Also, operation costs per hectare are lower with the use of tractor than with horses or oxen.[1]

The main factors now preventing the rapid introduction of efficient farm mechanization are (a) lack of the machinery itself both in volume and type; (b) poor maintenance and operation of existing machinery; (c) the need to adapt or develop machinery and work methods to Latin American conditions; and (d) the almost total lack of technicians and specialists, who could assume responsibility for maintenance of the machinery.

(4) Community planning and rural works

Development of rural communities equipped for a new farming era requires agricultural engineering for the technical planning of housing sites, the construction of highway feeder and rural roads, farm buildings, silos, storage facilities and other plant.

Developing countries engaged in programming land reform and large-scale rural settlements also need the basic contribution of this branch of agricultural engineering.

(5) Preservation and processing of agricultural products

Many agricultural products of high value (fruits and vegetables for example) are perishable. In Latin America they are often produced in inaccessible areas far from the centres of consumption. These products require processing to keep them fresh and reduce transport costs to a minimum. Processing is also extremely important in the preparation of products for export as a means of earning foreign exchange. Here agricultural engineering is indispensable, because the procedures required for these operations are all part of a single pattern which only engineers familiar with the agricultural aspects understand.

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[1] "Mecanización de la agricultura en América Latina", Economic Commission for Latin America study, 1951. The cost of farm operation using horse power was 54 percent higher than with a tractor; now, this proportion is even more favourable to tractors.

By direct processing of their own products production areas will also gradually develop, providing new job opportunities for those not engaged in agriculture who would otherwise seek work in manufacturing centres or large cities, thereby creating problems of overpopulation and crowding.

In these production areas the agricultural engineer would take charge of projects for preservation and processing of local produce, for utilization of by-products, conservation, and for such activities as the canning of tropical fruits, and preparation of balanced feeds for livestock.

ORIENTATION AND/OR SPECIALIZATION IN AGRICULTURAL ENGINEERING

It is clear that modern development of Latin American agriculture, applying new methods, advanced techniques and requiring machinery and new installations must necessarily have manpower qualified in agricultural engineering.

Conversion to an industrialized type of agricultural economy could be made rapidly in Latin America. However, it requires a cadre of professionals at the right time to overcome obstacles seriously hampering progress in individual countries.

To achieve this changeover to a modern and efficient industrial type of agricultural economy, therefore, the training of professionals with a sound education at an advanced level is vital. Yet, that is what is lacking in most Latin American countries.

The present programmes designed to train agriculturists offer neither a basic education in the mathematical and physical sciences, nor specialized instruction. Nor are there facilities necessary for the training of engineers with an orientation in agriculture.

Although present curricula offer a series of courses such as topography, elementary hydraulics, and rural construction work, they are generally taught by civil engineers, while the courses in farm mechanization are taught by agriculturists. Neither category is capable of providing the training required by agricultural engineers.

Many schools of agriculture in Latin America train a "general agriculturist" type of professional, for whom there are usually full-time jobs.

This kind of general education should now be relegated to history. It belongs to history rather than to the present because it is impossible to conceive any professional equally qualified in all agricultural sciences. Latin America is developing rapidly and needs an educational system dynamic enough to meet the future needs of development. It is indispensable to work towards an orientation and specialization linking civil, mechanical and industrial engineering with agriculture.

There is an urgent need to create regular academic programmes, including research, in agricultural engineering in Latin America. A training is needed which is appropriate to the proper development of irrigation projects, for solution of drainage and erosion problems, for the introduction of new farming techniques and farm mechanization, for rural construction work, for the preservation and processing of agricultural products, and, finally, projects for the wider introduction of technology to agriculture in general.

COURSES OF INSTRUCTION AND RESEARCH IN AGRICULTURAL ENGINEERING IN THE COLLEGES OF AGRICULTURE

To put the requisite curricula into effect, it is first necessary to recognize that these countries will need the following types of professionals for the modernization of their agriculture:

1. Graduates in agriculture with a sound orientation toward agricultural engineering, who will promote and directly apply modern agricultural methods.

2. Agricultural engineers, upon whom technical developments depend. They will be in charge of research in the various fields of agricultural engineering. They will initiate and adapt technical methods to local conditions and will give farmers, agricultural industries, and manufacturers encouragement to apply them.

   The training of these professionals requires an agricultural engineering curriculum in parallel with the general course of instruction in agriculture, so that part of the programme can be included to give the necessary orientation to the future agricultural engineering curriculum.

   (i) To attain this objective, the present curriculum for a degree in agriculture is divided into three parts:

   (a) a general basic course, with biology/socio-economics as core subjects

   (b) a course in agriculture

   (c) a vocational guidance course covering all branches of agriculture

   This arrangement marks important steps toward a programme of restructured studies, sufficiently flexible to permit the introduction of specializations related to the different branches of agricultural science.

   (ii) For example, using the biology/socio-economics core subjects as a basic course for all students, the necessary specializations can be introduced, when the time comes, as a cycle parallel to that of agriculture. Thus:

General basic course cycle with biology/socio-economics as core subjects

an animal husbandry course - vocational orientation toward stockraising	a course in agriculture - geared to farmers and agriculturists + post graduate studies	a course in forestry - vocational orientation toward forestry

The basic idea is that this 3-course curriculum for schools of agriculture allows for the introduction at any time, of any specialization in the agricultural sciences other than agricultural engineering.

(iii) However, from the standpoint of specialization in agricultural engineering as a career, consideration must be given to the content and sequence of courses and the duration of the general basic course of instruction, bearing in mind that agricultural engineering does not always require so complete a basis of biology/socio-economics as that needed by an agriculturist. But it does require an additional basic engineering course of study in the exact sciences. Hence the need for a sequence of courses in the basic biology/socio-economics cycle, arranged in such a way that in future students interested in agricultural engineering careers can take the courses they need as the first part of the course for two or three semesters. The students who are not interested in agricultural engineering can take the entire course. A draft scheme for this idea will be found on page 79.

(iv) On the other hand, when a course in agricultural engineering is introduced, part of it will be designed and planned in such a way that students in agronomy taking the agricultural course according to their interests, may elect for vocational orientation a number of practical and applied courses from the agricultural engineering curriculum. In this way the services of the teachers will be used to the utmost.

It would be practical to establish a series of courses in the different branches of agricultural engineering as orientation courses for graduates in agriculture. This will give them more opportunity of familiarizing themselves, not only with farm mechanization, but also the other aspects of agricultural engineering.

(v) Under this plan an agricultural engineering orientation course for agronomists would be offered as course III.

To offer agronomists a sound and practical orientation there must be about 30 to 40 elective credits in the agricultural studies programme, or about 1½ to 2 semesters work. This would be feasible without changing the main objectives of the present agricultural curriculum.

This orientation programme for agronomists could include the following courses:

irrigation systems
drainage systems
applied hydraulics
irrigation works
water-soil-plant relationship
water management and control
engines and tractors I
farm machinery I
organization of mechanized operations
rural electrification
farmland improvement
crop processing engineering
preservation of agricultural products, etc.

These courses would be given every year or every two years, according to the needs and number of students interested, until the programme can also be included in the curriculum for the degree in agricultural engineering.

(vi) At present, some schools of agriculture in Latin America are prepared to begin training agricultural engineers; that is to enter the second stage of development. At that level of the programme there are already a large number of courses in applied agricultural engineering in addition to the biology/socio-economics core subjects of the general basic training.

It is now necessary to organize the second stage in the curriculum development, the basic course in engineering, including the core subjects of physics, mathematics, draughtmanship and analytics. These courses can be given by mechanical and civil engineers, who will teach the basic disciplines of engineering, such as mechanical drawing, topography, applied mathematics, analytical mechanics, etc.

To do this, it is recommended that a section in general engineering be established within the department of agricultural engineering, because the level and thoroughness of the agricultural engineers' training depend on these basic engineering subjects.

The biology/socio-economics and exact sciences core programmes are the foundation for the training of agricultural engineers. With this foundation, agricultural engineers will have a good basic preparation in the exact sciences and a sound orientation toward the biological environment of agriculture. From the latter standpoint, the agricultural background on the campus of a school of agriculture is extremely valuable.

(vii) Once a degree in agricultural engineering is offered, increasing attention will be given to the preparation of other pertinent courses in the different branches of agricultural engineering. This part may be considered the third stage of development. It includes the courses of the agricultural engineering programme as such, based on the exact sciences and the biology/socio-economics sciences, as well as elective courses for orientation in one or several fields of agricultural engineering during the last year of the programme.

(viii) Afterwards, agronomists with an orientation in agricultural engineering and the agricultural engineering students proper may go on to the stage of preparing special studies and theses, thereby automatically initiating research work needed to solve their country's most urgent problems in this field. At the same time they will generate a better informed body of graduates. In this way it will be possible to set up a programme of education and research in agricultural engineering which, together with the present general curriculum in agriculture, can produce both agriculturists oriented toward agricultural engineering and agricultural engineers with a sound academic training.

The philosophy underlying this programme is that there should be no change in the curriculum for a degree in agriculture, as it now exists, nor in the sound objectives and principles of that course of study. The student body - the future leaders of agricultural development - should however be offered more orientation toward agricultural engineering and toward the industrialized type of agriculture that Latin America urgently needs.

AN EXAMPLE: LA FACULTAD DE INGENIERIA AGRICOLA (Faculty of Agricultural Engineering) IN PERU

Until 1959, the pattern of education in agricultural engineering in Peru was similar to that of most Latin American countries. What was called at that time Escuela Nacional de Agricultura (National School of Agriculture) at La Molina, provided compulsory courses in farm mechanization and irrigation as part of its agricultural curriculum.

However, several influential people in Peru were aware of the need for a more specialized programme. Outstanding among them was Mr. Enrique Blair, Director Regional (Regional Director) of the Instituto Interamericano de Ciencias Agrícolas (IICA - Inter-American Institute of Agricultural Sciences) at La Molina, now Minister of Agriculture in Colombia, whose wide experience in the field made him fit particularly well the role of adviser to the school authorities.

In January 1962 a United Nations Special Fund project was begun, with the Food and Agriculture Organization of the United Nations as Executing Agency, through which the Universidad Agraria (Agricultural University) of Peru was able to establish a College of Agricultural Engineering at La Molina. The Programme set up by the La Molina project lasted five years. The first three years consisted of compulsory courses in basic engineering and agriculture, while the last two years aimed at achieving partial specialization in the fields of soil and water engineering, farm mechanization, planning and rural works, or preservation and processing of agricultural products.

Students are awarded a degree of Bachiller en Ciencias de la Ingeniería Agricola (Bachelor of Science in Agricultural Engineering) and following presentation and approval of their theses, the degree of 'Ingeniero Agricola' (Agricultural Engineer).

The College was organized with the following departments:

1. General Engineering
2. Soil and Water Engineering
3. Agricultural Machinery
4. Planning and Rural Structures
5. Process Engineering

The Department of General Engineering is particularly important since the university does not have a school of engineering to teach the basic sciences in this field properly.

Although at first the research done in all fields was in the form of individual projects carried out by students for their theses, each department now has its own research programme.

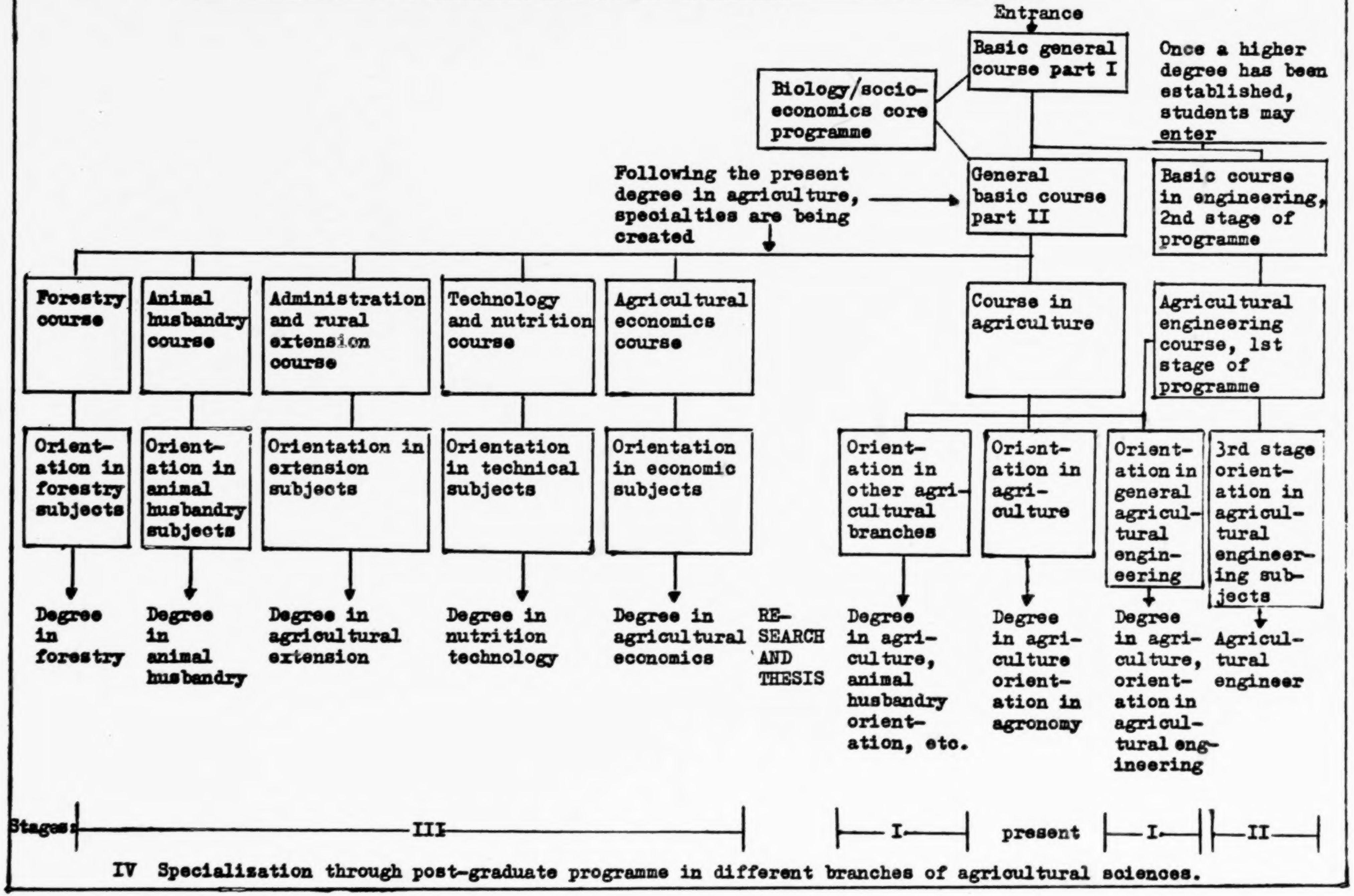
Enrolment in the Department has increased from 18 students at the beginning of 1962 to over 500 at present (1968).

Graduates have found well paid jobs in ministries, on plantations, in technical services, in the administration and control of irrigation works, in extension work, farm mechanization projects, large and medium-sized farms, settlements, and in all developing plan and land reform activities; as well as in work on soil conservation, teaching and research at the university level, and in the training of technicians and mechanics.

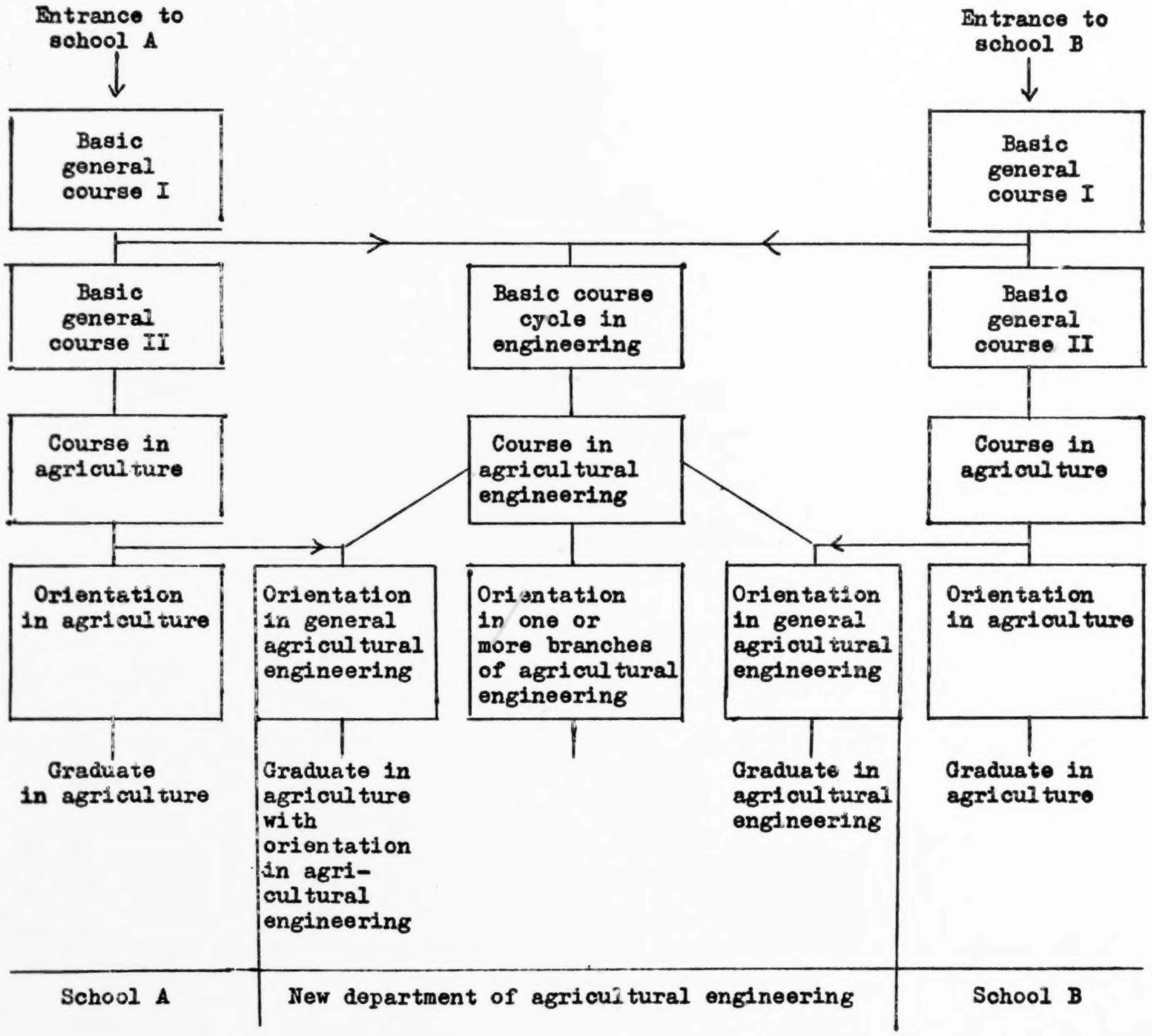
At present the Instituto Interamericano de Ciencias Agrícolas - IICA and the Universidad Agraria are organizing a programme for graduate students with UNDP and FAO aid. It will be an ideal continuation of the undergraduate programme previously established.

No doubt every Latin American country will have its own programme of education and research in agricultural engineering in the near future.

Suggestions on the introduction of orientation and specialization programmes - in agricultural engineering and other branches - in the schools of agriculture in Latin America (FAO/IDB draft)


Entrance
Basic general course part I
Biology/socio-economics core programme
Once a higher degree has been established, students may enter
Following the present degree in agriculture, specialties are being created
General basic course part II
Basic course in engineering, 2nd stage of programme
Forestry course
Animal husbandry course
Administration and rural extension course
Technology and nutrition course
Agricultural economics course
Course in agriculture
Agricultural engineering course, 1st stage of programme
Orientation in forestry subjects
Orientation in animal husbandry subjects
Orientation in extension subjects
Orientation in technical subjects
Orientation in economic subjects
Orientation in other agricultural branches
Orientation in agriculture
Orientation in general agricultural engineering
3rd stage orientation in agricultural engineering subjects
Degree in forestry
Degree in animal husbandry
Degree in agricultural extension
Degree in nutrition technology
Degree in agricultural economics
RESEARCH AND THESIS
Degree in agriculture, animal husbandry orientation, etc.
Degree in agriculture orientation in agronomy
Degree in agriculture, orientation in agricultural engineering
Agricultural engineer
Stages:
III
I
present
I
II
IV Specialization through post-graduate programme in different branches of agricultural sciences.

Outline of plan for two schools of agriculture with a joint department in agricultural engineering. [model: Facultad de Agricultura, Universidad de Buenos Aires (Faculty of Agriculture, University of Buenos Aires) and of the Universidad Nacional de La Plata] (La Plata National University).


Entrance to school A
Entrance to school B
Basic general course I
Basic general course I
Basic general course II
Basic course cycle in engineering
Basic general course II
Course in agriculture
Course in agricultural engineering
Course in agriculture
Orientation in agriculture
Orientation in general agricultural engineering
Orientation in one or more branches of agricultural engineering
Orientation in general agricultural engineering
Orientation in agriculture
Graduate in agriculture
Graduate in agriculture with orientation in agricultural engineering
Graduate in agricultural engineering
Graduate in agriculture
School A
New department of agricultural engineering
School B

UNIVERSITY TEXTBOOK PROGRAM IN LATIN AMERICA

by JOHN F. WOOD

Director, Regional Technical Aids Centre, Mexico.

The lack of an adequate range of good texts in Spanish is one of the most serious problems affecting the academic achievement of Latin American university students. The high cost of texts is another factor that prevents students with limited resources from buying the books they need to supplement the knowledge acquired in the classroom.

In order to contribute to the solution of these two basic problems - the shortage and high cost of good university-level textbooks - a far-reaching regional program has been started as the outcome of the collaboration of two United States Government agencies: the RTAC (Regional Technical Aids Centre) of A.I.D. (Agency for International Development) in Mexico and the USIS (United States Information Service) in Mexico and in Buenos Aires.

A year ago President Johnson in a statement of national policy on international activities connected with books and libraries said that it was through books that peoples communicate their beliefs, their aspirations, their cultural achievements and scientific and technical knowledge in the most lasting form. He called for a new and intense effort to make books available to other countries, to facilitate the development of regional bibliographical undertakings and to promote a continuous flow of books and other written educational materials.

An outstanding result of this effort is the program for the translation and publication of 125 university textbooks for classroom use in accord with the current programs in the higher education institutions. These are not reference works, but carefully selected textbooks of which there have been hitherto no editions in Spanish.

The selection of the 125 titles was made with the valuable collaboration of the Consejo Superior Universitario Centroamericano - CSUCA and the National Science Foundation of the United States. The books chosen cover the following fields: biology, physics, chemistry, geology, engineering, mathematics and medicine, including many which are relevant to the basic studies of students of agriculture.

For the translation and publication of the 125 textbooks of the regional program, RTAC and USIS have made arrangements with various Latin-American publishing houses. 45 books in the list have already been translated and published. The rest are in various stages of translation.

As part of this regional program, rental libraries or university book co-operatives have been established in several Latin-American countries.

The chief objective of the rental libraries is to make the essential books recommended by professors available to university students of limited means. The latter can use these books throughout the academic year against payment of a modest sum as a rental fee, or else they can buy them at cost prices.

In either case, through rental or sale, the libraries and co-operatives will have a revolving fund which they can subsequently use for the continuation of the program without further financial assistance from A.I.D.

Each rental library has been established with the financial assistance of the A.I.D. missions and with the books provided by the RTAC under its regional university textbook program. The funds supplied by the missions can be used for purchase of books not published by RTAC.

The present status of the program is as follows:

ARGENTINA - An agreement has been signed with the Universidad Católica de Córdoba for the establishment of a rental library.

BOLIVIA - Although no agreement has yet been signed, negotiations are now under way with officials of the Universidad Nacional de San Andrés in La Paz.

CHILE - An agreement for the establishment of a rental library at the Universidad del Norte in Antofagasta, is awaiting signature.

COLOMBIA - Agreements have been signed for the establishment of rental libraries at the Universidad del Valle, the Universidad de Antiquía and the Universidad Industrial de Santander.

COSTA RICA - An agreement has been signed with the Cooperativa Universitaria de Libros (University Book Co-operative). An agreement has also been signed with the Ministry of Public Education to provide books to the three teachers' colleges at Heredia, San Ramón and Liberia.

ECUADOR - An agreement has been signed for establishment of a rental library at the Universidad Central de Quito. Preliminary talks with officials of the Universidad Católica of Quito have also begun.

EL SALVADOR - Preliminary talks with officials of the Universidad Católica José Simeón Canas in Salvador have begun for the establishment of a rental library.

GUATEMALA - Preliminary talks with officials of the Universidad de San Carlos have begun.

HONDURAS - A rental library is in operation at the Universidad de Honduras.

MEXICO - A rental library is in operation at the Universidad de Guanajuato. Agreements have also been signed for the establishment of rental libraries at the Universidad de Chihuahua, the Universidad de Puebla, the Universidad de Morelia, the Universidad de Yucatan and the Instituto Technológico de Morelia.

NICARAGUA - Rental Library Agreements have been signed with the National University and the Universidad Centro Americana in Managua and with the National School of Agriculture.

PANAMA - Preliminary talks have begun with officials of the Universidad Nacional and the Universidad de Santa María La Antigua.

PERU - Agreements have been signed for the establishment of six rental libraries - at the School of Education of the Universidad Nacional de Trujillo, the Universidad Nacional Agraria, the Universidad Nacional de Ingeniería, the Universidad Peruana Cayetano Heredia, the Universidad Técnica del Altiplano in Cuzco and the Instituto Nacional de Mujeres in Lima. Negotiations are now under way with officials from two other institutions.

DOMINICAN REPUBLIC - Four rental libraries are already in operation, and agreements have been signed for the establishment of two more. The rental libraries at the Universidad Nacional Pedro Henríquez Ureña, the Acción Pro Educación y Cultura (Action for Education and Culture), the Universidad Católica Madre y Maestra and at a school of agriculture are now in operation. The two agreements that have been signed are for the establishment of rental libraries at the Universidad Autónoma de Santo Domingo.

URUGUAY - Preliminary talks have been begun with officials of the Universidad Nacional de la República Oriental del Uruguay for the planning of a rental library.

VENEZUELA - Three agreements have been signed for establishment of rental libraries at the Universidad de Carabobo, the Instituto Pedagógico Experimental de Barquisimeto and another establishment. Agreements with the Universidad de Zulia and the Universidad del Oriente are still pending signature.

To help the rental libraries and the universities in the selection of the books they can obtain through purchase, RTAC and USIS recently published an extremely important work entitled TEXTOS UNIVERSITARIOS (University Textbooks).

The lists of the books included in this catalogue were provided by 24 leading publishing houses of Latin America. This comprehensive catalogue contains thousands of titles in over 900 pages of text, and both author and subject indices.

This is the first and most complete catalogue of university textbooks published in Latin America. Those interested in obtaining a copy of this catalogue, entirely free of charge, may contact the RTAC representative in the A.I.D. mission in their respective Latin American countries. The official will also be glad to give them any additional information they may require on the regional program for university textbooks.

WORLD CONFERENCE ON AGRICULTURAL EDUCATION AND TRAINING
COPENHAGEN, JULY/AUGUST 1970

The XIVth Session of the FAO Conference in November 1967 approved the convening of a World Conference on Agricultural Education and Training, to be organized in full collaboration with UNESCO and ILO, subject to the availability of the necessary financial support.

In recent discussions between the Directors-General of the three organizations, it has now been agreed that the Conference will be held in 1970, the year the Secretary-General of the U.N. proposes to designate as "International Education Year". It is extremely appropriate that agricultural education and training, which are vital to agricultural improvement in the developing countries, should be the subject of a World Conference as one of the highlights of the International Education Year.

Early in 1968 a joint FAO, UNESCO and ILO Preparatory Working Group for the World Conference on Agricultural Education and Training held two meetings. As a result, the working papers on the World Conference prepared for the FAO Advisory Panel on Agricultural Education and the Ad Hoc Working Party of Selected Administrators of Agricultural Training Programmes, for their meetings in May, represented the agreed proposals of the three organizations. Both these meetings warmly endorsed the proposal to hold the Conference; expressed their satisfaction that this was to be a joint undertaking by the three U.N. agencies concerned; and welcomed the fact that machinery to ensure proper co-ordination in the planning of the Conference had already been established.

The reports of the Panel and the Working Party, which are now generally available, contain an agreed statement of "Aims and Purposes" of the Conference and conclusions upon scope and subject matter.

The necessity for the Conference to have clearly defined objectives and a strong and practical orientation towards meeting the urgent needs of developing countries was emphasized. Participation of key personalities in the field of agricultural education and training would be sought, as well as adequate representation by the different levels of education and training together with other important interests (producers' organizations, co-operatives, etc.).

Three commissions are proposed on:

(a) Higher Agricultural Education

(b) Intermediate agricultural education and training

(c) Vocational training for farming and related occupations.

Two other major topics to be dealt with in plenary sessions are:

(a) The planning of agricultural education and training for agricultural development

(b) A new strategy.

The Government of Denmark has generously offered host facilities for the Conference in Copenhagen in 1970. Proposed duration is two full working weeks.

CO-OPERATION BETWEEN FAO, UNESCO AND ILO IN AGRICULTURAL EDUCATION, SCIENCE AND TRAINING

Three of the specialized Agencies of the United Nations system - FAO, UNESCO and ILO - render assistance, to their member Governments, in various aspects of agricultural education and training.

Recently, the Directors-General of these Agencies met in order to decide on the form of their future collaboration so as to serve the best interests of their Member Nations. As a result of this meeting the Aide-Mémoire reproduced below was issued jointly by the three Agencies.

1. Introduction

As stated in connection with agricultural education in the 34th Report of the Administrative Committee on Co-ordination, further consultations between the three Directors-General concerned resulted in agreement on a new approach involving complementary or joint action, based on the respective competences of the three Agencies. This approach is embodied in the joint statement of the three Directors-General annexed to the 34th Report of the Administrative Committee on Co-ordination (see Annex).

It was further recognized that it was urgent to have an arrangement whereby the complementary character of different fields of specialization involved in the development of agricultural education, science and training as well as rural employment programmes could appropriately be combined to meet the demands of agricultural development and of human resources promotion of member countries.

In order to ensure that there is common understanding of what is meant by the concept of complementarity in the context of the respective responsibilities of the three Agencies and with a view to providing guidelines which could be clearly understood and followed at the working level by Member Governments and the three Agencies, the three Directors-General have agreed on the following basis for developing, where appropriate, concerted and integrated activities in agricultural education, science and training.

2. Basis

In order to provide a more effective and expanded service to Member States, FAO, UNESCO and ILO, making full use of their complementary expertise in agriculture, education and rural employment respectively, will undertake complementary programmes or joint action projects, where appropriate, based on the following criteria. Primary responsibility for a particular programme or project which, in the promotion of the common goal of economic and social development in the rural area, consists in the promotion of agriculture, including fisheries, forestry and nutrition, will rest with FAO, in the promotion of education, will rest with UNESCO, or in the promotion of rural employment, will rest with ILO.

3. Planning agricultural education science and training as well as rural employment

The Organization which has taken the initiative or received a governmental request shall consult the two other Organizations with respect to the general conception of the programme or project concerned, and the part each might appropriately play in its execution.

Arrangements will be made for sub-contracting, where applicable, or for support, assistance or advice by the other two Organizations. Once agreement has been reached on the programme or project, it will be carried out by the Organization responsible according to the criteria enunciated above with the participation of the other Organizations in the manner agreed at the planning stage.

4. Complementary programmes

(a) Farmers training

FAO has primary responsibility for programmes or projects in this field. As appropriate, UNESCO and ILO will contribute complementary services in their respective fields including functional literacy and rural employment.

(b) Functional literacy

UNESCO has primary responsibility for programmes or projects in functional literacy. As appropriate, FAO and ILO will contribute complementary services in their respective fields, including agricultural extension, and industrial training, and employment.

(c) Rural employment

ILO has primary responsibility for programmes or projects in rural employment. As appropriate, FAO and UNESCO will contribute complementary services in their respective fields.

5. Joint projects

(i) Agricultural education, science and training projects will be the subject of consultations and joint planning and evaluation by FAO and UNESCO, but will be executed by one of the two Agencies on the basis of the foregoing criteria with sub-contracting arrangements with the other.

- in projects for which FAO is the executing agency, the basic science and pedagogy component will be sub-contracted to UNESCO;

- in projects for which UNESCO is the executing agency the appropriate elements of the agricultural science component (that is applied agricultural sciences together with those of the derived sciences which have major applied elements) will be sub-contracted to FAO.

(ii) Rural training projects will be the subject of joint consultations and planning by FAO and ILO, but will be executed by one of the two Agencies, on the basis of the foregoing criteria, with sub-contracting arrangements with the other.

- in projects for which FAO is the executing agency, the rural employment component will be sub-contracted to ILO;

- in projects for which ILO is the executing agency, elements contributing to agricultural development will be sub-contracted to FAO.

6. Programme advice

To advise the Directors-General of the three Organizations on the planning and executing of programmes of agricultural education, science and training as well as rural employment on the basis of the agreed complementary roles of the respective Organizations, and of the criteria established in this Aide-Mémoire for primary responsibility, a joint FAO/UNESCO/ILO Advisory Committee of Experts on Agricultural Education, Science and Training will be established with the approval of the governing bodies of the three Organizations. The statutes of the Committee, whose members will be jointly appointed by the three Directors-General, are hereunder set forth:

JOINT FAO/UNESCO/ILO ADVISORY COMMITTEE ON AGRICULTURAL EDUCATION, SCIENCE AND TRAINING

STATUTES

Article I

A Joint FAO/UNESCO/ILO Advisory Committee on Agricultural Education, Science and Training, hereinafter referred to as "the Committee", is hereby established.

Article II

1. The functions of the Committee shall be to advise the Directors-General of the three Organizations on the planning and execution of programmes of agricultural education, science and training as well as rural employment on the basis of the agreed complementary roles of the respective Organizations and of the criteria established in the Aide-Mémoire for primary responsibility.

2. In particular, the Committee, when requested, shall advise upon:

(i) Manpower assessment and planning in relation to agricultural development within the context of national and regional development planning;

(ii) Planning the development of agricultural education, science and training in relation to the requirements of agricultural development, rural employment, and systems of general education, notably within the framework of national development plans, priority needs and available resources;

(iii) Improvement of the efficiency of agricultural education, science and training through better teaching, the provision of suitable textbooks and teaching materials and appropriate facilities;

(iv) Organization, administration and institutional requirements of agricultural education, science and training.

Article III

1. The Committee shall be composed of 18 members serving in a personal capacity. The members shall be appointed by the Directors-General of the three Organizations on the basis of their competence in the field of agricultural education, science and training, and bearing in mind the need to ensure appropriate geographical distribution.

2. The term of office of members of the Committee shall be four years. Nevertheless, the Directors-General of the three Organizations in appointing the first members of the Committee, shall designate nine members whose terms of office shall end two years after their appointment. Terms of office may be renewable.

3. In the event of the resignation, incapacity or death of a member of the Committee, the Directors-General of the three Organizations shall appoint a replacement for the remainder of his term.

Article IV

1. The Directors-General of the three Organizations shall designate members of the Secretariat of their Organization to represent them on the Committee without the right to vote.

2. The Secretariat of the Committee shall be provided by the Secretariats of the three Organizations.

Article V

1. The Committee shall meet at least once every year. Each Organization in turn shall act as host to the sessions of the Committee.

2. At each of its sessions, the Committee shall elect a Chairman, a Vice-Chairman and a Rapporteur, who shall remain in office until the following session of the Committee.

3. The Chairman, the Vice-Chairman and the Rapporteur shall constitute the Bureau of the Committee.

4. The Directors-General of the three Organizations shall convene the sessions of the Committee. They may also convene the Bureau of the Committee.

Article VI

The travel expenses and subsistence allowances of members of the Committee shall be borne by the three Organizations in a manner to be determined by agreement between them.

Article VII

1. Member States and Associate Members of each Organization may send observers to meetings of the Committee.

2. The United Nations and other organizations of the United Nations system which have concluded mutual representation agreements with any of the three Organizations may send representatives to meetings of the Committee.

Article VIII

The Directors-General of the three Organizations by mutual agreement may extend, as appropriate, invitations to send observers to meetings of the Committee, to:-

(a) organizations of the United Nations system;

(b) intergovernmental organizations; and

(c) international non-governmental organizations;

(d) chairmen of other advisory bodies within each Organization.

Article IX

The Directors-General of the three Organizations may invite one or more experts whose advice on particular subjects is deemed necessary, to attend meetings of the Committee as consultants without voting rights. Such experts shall receive the same allowances as the members of the Committee.

Article X

1. The Committee shall adopt its Rules of Procedure, which shall be submitted to the Directors-General of the three Organizations for approval.

2. The agenda of the sessions of the Committee shall be drawn up by the Directors-General of the three Organizations.

3. After each session, the Committee shall present a report on its work and recommendations to the Directors-General of the three Organizations.

Article XI

These Statutes may be amended by agreement between the three Organizations.

7. Programme planning and execution

To facilitate the planning and executing of complementary or joint action programmes or projects set forth above, an Inter-Secretariat Working Group, consisting of three officers responsible for the programme within the three agencies, will be established and meet for two or three days initially every two months and subsequently as frequently as required. The functions of this Working group are to assist the three Directors-General in implementing the terms of the present Aide-Mémoire and report to them by means of:

(a) Reviewing current activities in the field of agricultural education, science, and training and rural employment in each of the three Agencies with the object of effecting better co-ordination and co-operation to achieve the maximum impact within the framework of their agreed roles.

(b) Consulting and agreeing upon sub-contracting arrangements where appropriate.

(c) Consulting upon any proposed new plans and developments in agricultural education, science, training and rural employment in order that available resources may be put to optimal use.

(d) Exploring and advising upon means by which improved service in agricultural education, science, training and rural employment may be given to member countries through the combined efforts of the three agencies.

8. In addition, the need is recognized for continuing contact and consultations at the technical level as well as the prompt exchange of all enquiries and requests received by one agency regarding the matters covered by the Aide-Mémoire with the other two.

9. This Aide-Mémoire will be submitted by the three Directors-General to their respective Governing Body, Council or Executive Board as the case may be for endorsement.

David A. Morse
Director-General
International Labour
Office

Addeke H. Boerma
Director-General
Food and Agriculture
Organization

René Maheu
Director-General
United Nations Educational
Scientific and Cultural
Organization

Rome, 3 May 1968

ANNEX

Joint Statement on Agricultural Education to the ACC

The following report is the one to be annexed to the ACC's annual report to the Council in accordance with the latter's request in resolution 1277 B (XLIII).

The question of agricultural education, agricultural science training, and agricultural training has been the subject of continuing consultations between the ILO, FAO and the UNESCO over the last several months. As the result of these consultations, the Directors-General of the three Organizations concerned have come to the conclusion that, the solution of this problem lies in an integrated approach as agricultural education and training are vital components of agricultural development, within the wider context of economic, social and cultural development as a whole. Increasing emphasis is now being placed upon the development and utilization of human resources and, Resolution 1274 of the XLIII Session of ECOSOC calls upon the United Nations and its Specialized Agencies to increase concerted efforts in this field of endeavour. All these factors, together with the gravity and urgency of the world food problem, imply the need for new and sustained efforts by the three Agencies to combine their available resources and expertise to discharge their responsibilities in the field of development and human promotion.

Although progress has been achieved in the recent past, the share of resources allocated to agricultural education, science and training is still relatively small and not increasing at an adequate rate. It appears, therefore, that, unless an accelerated, continuing and major effort is undertaken by the three Organizations in the years ahead, they will be unable to meet even partially the numerous requests from Member States for increased assistance in the development of agricultural education, science and training.

Within the framework of their constitutional mandates and their approved work programmes, all the available intellectual and material resources of the three Organizations should be mobilized to face problems which cannot be effectively dealt with in an isolated manner or by any single Agency action in areas where combined effort would be more fruitful. The solution to these problems must be found in the perspective of a global effort aimed at linking closely the activities undertaken in the fields of education, science training and general training, with the targets set by the economic and social development plans. In other words, it is essential that projects which have been carried out until now on an individual basis in certain fields of activities within the competence of one Organization, or another, must be conceived and carried out within an over-all framework set up by mutual agreement between the three Organizations wherever such action would enhance the contribution of such efforts. The key to the problem is the concept of complementarity and joint partnership, i.e. the imperative for the three Organizations to respond collectively, to the best of their abilities, to the aims and requests of Governments which, on their side, are striving to integrate in the over-all framework of their economic and social objectives.

The main problem, however, is to have a common understanding of what is meant by the concept of complementarity in the context of our several responsibilities in the field of agricultural education and training. These concepts can be interpreted as meaning the pooling of resources and their utilization in precisely the same aspects of agricultural education and training as hitherto by all the different Agencies, which will not meet the desired objective. What is urgently needed is to have an arrangement whereby the complementary role of different fields of specialization involved in the development of appropriate agricultural education programmes could appropriately be blended to meet the demands of agricultural development and of human resources promotion of member countries.

The fields in which the activities of the three Organizations appear to be most closely complementary and inter-related, and calling, therefore, for the above approach are:

- Planning of agricultural education, science and training;
- Agricultural secondary and post-secondary education;
- Teacher training in agriculture;
- University education in agriculture - undergraduate and post-graduate;
- Vocational training in agriculture.

The three Directors-General have had a fruitful exchange of views as to how the concepts of complementarity and joint partnership could be translated into practical application. They agreed to have the matter studied further by their representatives and to meet again in May in order to see whether a mutually acceptable arrangement could be established which would provide the basis for a viable working relationship.

It is pertinent to observe in this connection that the General Conference of FAO and its Council have passed resolutions to set up, subject to the concurrence of the UNESCO Executive Board, an ad hoc inter-governmental Committee under Article III of the "Relationship Agreement" to review the whole matter. These resolutions will be placed before the UNESCO Executive Board meeting at the end of May for consideration and appropriate action having regard to UNESCO General Conference Resolution 2.343, which had given necessary authorization in the matter to the Board. The Directors-General of FAO and UNESCO, have agreed that if such a Committee is to be established, the ILO should be associated in a proper manner with its work. Meanwhile, it is the considered view of the three Directors-General that any practical form of co-operation agreed to by them would provide an important contribution to a lasting solution of the problem.